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Sun Prairie, Wisconsin

Corn Grower's Annual for 1958-59

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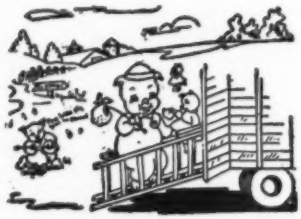

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The Farmer's Digest

Volume 22 June-July 1958 Number 2

Can You Grow 100-Bushel Corn Without Cultivation?

New residual weed killers may make it possible to quit cultivating corn . . .

Condensed from Capper's Farmer

Ralph V. Peebler

TWO years ago word got around that Missouri weed scientists had grown over 100 bushels of corn to the acre without even wheeling a cultivator into the field.

The yield—106 bushels—was no mean feat. But the exciting part of this research is the prospect that you soon may be using hard-hitting weed killers in place of cultivation—maybe even cutting it out entirely.

O. H. Fletchall and his team of Missouri weed fighters had several chemicals in these tests. Among them were some new selective compounds that had just hit the scene.

One of these — Simazine — looked like a new kind of killer, with a new kind of kill! It clobbered weeds for a full 5 months—straight thru to harvest.

What makes this new chemical so unusual is the way it hits all kinds of annual weeds—both the broadleaves and grasses. It has all the earmarks of being as spectacular as 2,4-D.

Last year in Scotland county, Missouri, Olin Boyer used it on a field of corn on upland silt loam. Two pounds of Simazine per acre whipped smartweed, pigweed, giant and common foxtail, and barnyard grass. The yield: 80 bushels to the acre—with no cultivation the entire season.

Boyer checked this field against a cultivated piece which

Reprinted by permission from Capper's Farmer, Topeka, Kansas

had one rotary hoeing, one regular cultivation. It made 74 bushels per acre. Boyer's Simazine-sprayed corn topped it 6 bushels.

Weed workers say this extra yield seems to average about 10 per cent. Yield increases no doubt come from saving corn roots from brutal pruning by cultivation. Also, from the extra fertility and moisture that weeds don't take up.

Wrong prediction: In 1857 when Lt. Joseph Ives was sent to explore the Grand Canyon, his report concluded with: 'There is nothing to do but to leave, and ours is the first and will doubtless be the last party of white people ever to visit this profitless locality.' Millions of visitors have proved this prediction to be wrong, as many are.

"It's easy to spot a Simazine-treated field," says Bruce Rogers, Purdue weed scientist. Corn is taller. And it's nearly weed-free."

"Simazine worked under extremely dry conditions in '56, extremely wet in '57. But it won't handle perennial weeds like horsenettle or bindweed."

It has two other drawbacks. Corn is the only major row crop that is tolerant. And residual action may last too long—especially if you rotate crops.

Simazine has been tested since 1956 on a host of crops thruout the Midwest by some 50 weed scientists. It has been outstanding on corn where 1 to 4 pounds were applied before weeds popped out of the ground.

Rates as low as 1 pound have given good control on sandy land. From tests so far, 2 pounds would seem about right for most Midwest soils. But heavier rates are needed on heavy mineral or organic soils.

Says Fred Slife, University of Illinois: "Results with broadcast treatments of 2 pounds per acre have been excellent in Illinois. If Simazine is released for general use, farmers may find it rather expensive in early stages, making band treatment practical.

"Early tests indicate that Simazine will be effective against all annual broadleaf weeds and grasses. No detrimental effect has been observed on corn with as much as 8 pounds of active ingredient per acre."

Simazine is available as Geigy Simazine 50W, a 50 per cent wettable powder. Pellets containing 10 per cent active ingredient also are on the market. You can get either formulation for experimental testing. However, neither one is released for general farm use.

Over most of the Corn Belt you would use this material as a pre-emergence treatment. Simazine is practically insoluble in water. It remains in the upper soil layer right where it can attack germinating weeds.

With post-emergence treatments, you need to use plenty of water to carry the chemical down to the roots. Good control of broad-leaved and grassy weeds rests in the way the chemical is taken up by the root system rather than any contact action.

The low solubility of Simazine adds to its residual action. It remains active in the soil for about 6 months. This may be a count against it. Fletchall noticed injury to wheat seeded after a corn crop was sprayed with Simazine.

Whether or not you'll be growing corn without cultivation, future tests will tell. As one noted weed scientist says of most new herbicides: "We now have the chemical. All we have to do is learn how to use it!"

Editor's Note: Since this article was published in May 1958, Simazine has received label approval for use in corn (includes seed, field, silage and sweet corn). Label approval on corn was granted for overall applications of 2 to 6 pounds of the preparation per acre (1 to 3 pounds active ingredient per acre) and band applications at proportional rates depending on the width of the band. Simazine has also been approved for use on ornamentals, nursery plantings and non-crop land. However, it has not yet been approved for use on any other crops.

Sulfate Potash May Boost Corn Yield

Farmers trying for "record" yields of corn and grain can use potash fertilizer in the sulfate form rather than the usual chloride form, say University of Wisconsin soils researchers K. C. Berger and E. L. Hobson.

Their work suggests that the sulfate form of potash fertilizer may give better corn and oats yield than the chloride form. But Berger and Hobson point out that the sulfate form is more expensive than the chloride form. This means it may not be economically practical for most farmers. The increased fertilizer cost would be as much as or more than the value of the increased yield.

The most economical practical way to use fertilizer on corn is to broadcast the usual chloride form of potash, then apply the nitrogen and phosphorus in the row. —*Wisconsin Extension*

How to Mothball Your Corn Planter

Your planter will last longer and do a better job if you follow these suggestions . . .

Condensed from Hoard's Dairyman

George E. Pickard, University of Illinois

A PLANTER does not ask for much special care but it will really cause you lots of grief, to say nothing of lost time and poor crops, if you neglect it. Like most other machines, success in operation depends a great deal on the attention given to putting it away in good shape after the planting season is over and preparing it for work the following spring.

If your wife left her fur coat hanging in the closet all summer without any moth protection you would hit the ceiling, wouldn't you? Corrosion can eat up your planter just as surely and as quickly as moths can eat the fur coat.

The comparison can be carried even further. Safety from moths calls for cleaning, followed by protection with some sort of repellent to keep the moths away. Likewise, planters must first of all be thoroughly cleaned to remove all traces of fertilizer, soil, and seed treatment that can cause corrosion; then they should be protected with a coating of oil or grease to keep the air and moisture away from the metal.

Clean and oil . . .

Starting with the seed hoppers, remove the plates so as to be sure that there are no seeds sticking around cut-off pawls and knockers.

Clean all of these seed metering parts carefully. If you have been planting beans treated with inoculant or any seed with which an insecticide such as aldrin has been mixed, it will be necessary to wash the parts thoroughly as both of these materials tend to cause sticking of the dogs or knockers even if no rusting occurs. Coat all of these seed box parts with a medium weight oil. Too thin an oil gives only partial protection.

If your planter is equipped for

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power or check dropping, examine the valves to be sure there is no dirt or fertilizer wedged in them. This will cause rusting and will interfere with proper operation so that uneven stands will result.

The furrow openers themselves should, of course, be cleaned and oiled to prevent rusting.

If your planter has a fertilizer box, it will require special care. First of all, to get all of the caked fertilizer out from around and under the feed wheel it is usually best to use water pressure from a hose. It will often be necessary to scrape parts on which the fertilizer has caked. When the parts are dried, coat them thoroughly with medium-weight machine oil or used transmission oil thinned with a small amount of kerosene. It is better still to repaint the sheet metal of the seed and fertilizer hoppers after they have been cleaned and dried.

Just as your wife airs out her coat to get rid of the moth ball smell before she wears it, you have to get rid of the oil that has protected your machine parts when it comes time to plant again. Washing in gasoline or other solvent is the best method, using all precautions to prevent fire. In other words, do it out in the open.

If you use fertilizer solutions with your planter, the moth-balling operation is very much simplified because there is no scraping and washing to do. Flush the tank and system out thoroughly two or three times with water; then fill the tank or tanks with water and add a quart of oil to each. Now, as the tanks and system are emptied a film of oil is left clinging to all the inside surfaces. The outer surfaces also should be washed and oiled wherever the fertilizer has been in contact. If a pump system (other than a hose pump) is used, the pump should finally be removed and stored in oil.

Early spring chores . . .

As soon as you have bought your seed, you will want to have it checked by your planter dealer to be sure you have the correct plates to sow your particular seed uniformly and accurately at the rate you want to plant it. Seed corn, for instance, may vary considerably in size and shape from year to year even within the grades described as medium flat, and so forth. You can, therefore, protect yourself against poor stands and lost time at planting by making use of this service of your dealer. Be sure to have it done early so he has time to order the plates you need in case he is out of them.

At the same time, check your planter for any parts that may need replacing. You may have made a list of these parts when

you cleaned up the machine for storage. This is an excellent practice with all equipment.

Checking for worn parts . . .

In checking over the planter for needed replacement parts, pay particular attention to the cut-off pawls and the knockers. Worn pawls and weak springs are, after improperly chosen plates, the most common causes of uneven planting.

Be sure to check the bearings of the hopper drive shafts and the seed-plate shaft. When these bearings become badly worn, the bevel gears of the seed-plate drive mesh improperly, bind, and break.

Of course, your planter will last much longer if you store it inside. In fact, machines such as planters that are used only a few days per year take much more of a beating from the weather than they do from actual working. A planter several years old can look like new if given this special care.

Don't forget to jack the planter up to take the weight off the tires and, especially if you have to leave it outside, be sure the furrow openers are up clear of the ground. Before you start to plant in the spring, check the inflation pressure of the tires against the recommendation in your operator's manual since manufacturers differ in their instructions.

Corn Still Top Silage Crop But Other Crops Can Be Used

Corn is still the best full season silage crop for general use because of its consistently high yield of high quality silage.

Virginia agronomists say other crops are not recommended in preference to corn for silage where corn can be planted at the normal time and recommended production practices can be followed. However, many farmers have requested information about specific mixtures, planting rates, and methods of plantings on other silage crops; and based on current data, here are the experts' suggestions.

Corn (10,000 seeds per acre) and sorghum (5 pounds) planted in rows; corn (16,000 to 20,000 seeds) and soybeans (½ bushel) planted in rows; sweet or forage sorghum (10 pounds) in rows; sweet or forage sorghum (20 pounds), sudan grass (10 pounds), pearl millet (10 pounds), and soybeans (½ bushel), broadcast; sweet or forage sorghum (50 pounds) broadcast; grain sorghum (10 pounds), in rows. —*Agricultural Newsletter*

Corn Costs Money

To estimate your per bushel costs, check the figures below . . .

Condensed from Wisconsin Agriculturist

FOR YEARS corn has been the "big money" crop on many cornbelt farms. And it has been the basic crop for most rotations.

Even though returns have been generally high for corn, few folks actually realize the cost of growing an acre or a bushel from planting to marketing. Costs take a big bite out of a 70-bushel yield. But the bite is nearly as big for a 40-bushel yield or for a crop failure.

With lower corn prices, these cost figures become increasingly important. Fertilizer rates must be reconsidered. Some pencil pushing may reveal where production costs can be reduced.

Of course, costs will vary greatly. Land price, size of the farm, size of equipment, and value of equipment will all have a say in determining production costs. Management level also has a big voice in setting the per bushel costs.

Let's take a close look at a typical farm using 2-row equipment. We'll figure the land is worth $300 per acre, and we'll assume an owner operation. Here is about what such a farmer can expect to incur in the way of expenses:

	Cost per acre
Plowing	$ 2.50
Harrowing (2)	.50
Disk (2)	1.60
Spread fertilizer (broadcast)	.70
Planting	1.20
Rotary hoe	.50
Cultivate (2)	1.70
Picking	3.25
Hauling and cribbing	2.00
Total	13.95

The above charges are for equipment only and do not include labor. You'll notice that no charge was included for chemical control of weeds or insects.

Now let's consider labor and supplies:

Labor	$ 7.30
Seed	2.00

Reprinted by permission from Wisconsin Agriculturist and Farmer, Racine, Wisconsin

Fertility depletion (fertilizer and lime)	13.60
General expenses and overhead	7.27
Total	$30.17

A charge for the land must be added on, too.

Land—$300 per acre at 4%	$12.00
Taxes	3.00
	$15.00

This makes the per acre charge $57.85. For an 80 bushel crop, the per bushel charge is 72 cents. But for a 50 bushel crop the cost per bushel goes up to $1.16.

You'll notice no charge was made for crop insurance. And the possibility of replanting was not considered. These along with weather damage and marketing costs should be figured in as well.

The "break-even" point in a recent Purdue University study of crop costs was found to be about 44 bushels per acre on first year corn following a legume sod. This was figuring corn at $1.12 per bushel.

For second year or later corn the break-even point went to 49 bushels per acre. These figures are for owner operations. For 50-50 crop share leases the Purdue scientists figure a break-even point of 55 bushels per acre for second year corn.

In the study, Purdue found as much as $9 an acre difference in costs depending on soil type.

A seed-corn stockpile maintained by the University of Illinois is the world's largest collection of corn. Carrying many different genetic traits, the seed corn from this stockpile is used in all parts of the United States and throughout the world.

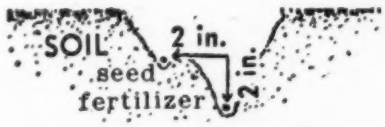
Prairie soils much like those of Southern Wisconsin were highest —$58.32 per acre. Next came silty clay soils with 2 to 7 per cent slope totaling up to $55.27 per acre for growing and harvesting costs. Lighter soils figured $47.78 per acre.

In summarizing their work, the Purdue scientists forecast greater use of commercial nitrogen with more acres devoted to corn. And except where soil structure is a problem, they foresee fewer acres of meadow.

Each farm presents a different situation in figuring crop production costs. Land value is a big factor. Figures here are only estimates based upon Midwest cost studies.

By carefully checking these figures, you may be able to spot areas where your per bushel costs may be reduced or where acreages of crops should be shifted.

Fertilizer Placement Is Important



Fertilizer in the row at planting time should go two inches below and two inches to one side of the seed . . .

Condensed from Nebraska Farmer

M. D. Weldon, Agronomist at Nebraska College of Agriculture

PUT your starter fertilizer where it will do your corn the most good.

The best placement is in a band 2 inches from the seed row and an inch or 2 deeper than the seed. Then it will be in the path of the growing roots. This gives the corn the phosphorus it needs, gets it off to a fast start, and sets the stage for earlier maturity and a big yield at harvest time.

Starter fertilizer contains phosphate. It may also carry nitrogen or potassium or both.

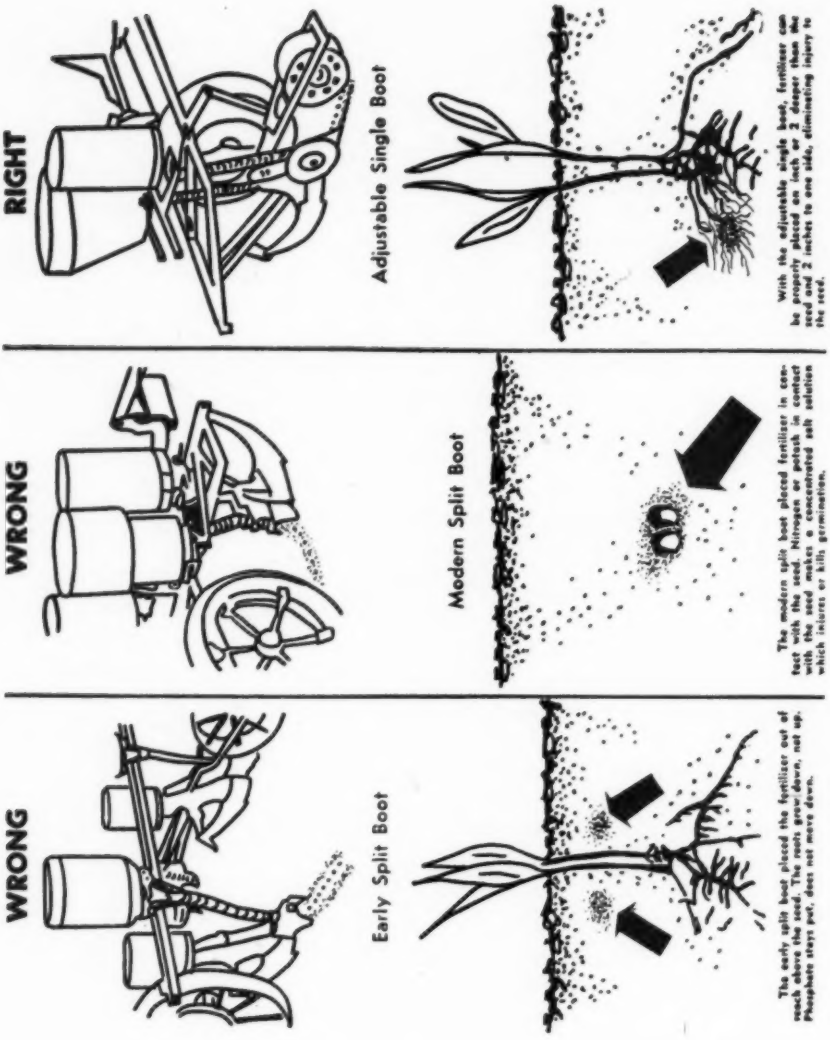
Starter fertilizer is placed in the row close to the seed at planting time. But if poorly designed or adjusted equipment is used, the starter may be placed where it is not effective. Poor placement may injure the germinating seed.

The old split boot attachment for the corn planter places the starter fertilizer on both sides of the row, above the seed. As the roots go down, they miss the fertilizer and it is not effective. If it rains, some of the fertilizer may move down to the roots, but this is only partly effective.

Some attachments spill a part of the fertilizer directly on the seed. The fertilizer gathers moisture and makes a concentrated salt solution. In contact with the seed, the solution injures or kills germination. This is especially likely to occur if the soil is medium dry, if there is no rain for several days after planting, if heavy application of fertilizer is used, and if the corn planter is run at high speed (4 miles per hour or more).

The modern adjustable single boot fertilizer attachment for the corn planter or lister places the fertilizer on one side of the row, deeper than the seed. There is no chance for the fertilizer to injure the seed or the young sprout. When the roots reach the fertilizer band, their growth is

Reprinted by permission from Nebraska Farmer, Lincoln, Nebraska


RIGHT
Adjustable Single Boot
With the adjustable single boot, fertilizer can be properly placed an inch or 2 deeper than the seed and 2 inches to one side, eliminating injury to the seed.
WRONG
Modern Split Boot
The modern split boot placed fertilizer in contact with the seed. Nitrogen or potash in contact with the seed makes a concentrated salt solution which injures or kills germination.
WRONG
Early Split Boot
The early split boot placed the fertilizer out of reach above the seed. The roots grow down, not up. Phosphate stays put, does not move down.

ABOVE: With the high analyses and heavier applications now being used on corn, it is important that starter fertilizer be placed just right by your planter. Here are illustrated the shortcomings of old type fertilizer attachments and advantages of new.

stimulated and they make good use of the added nutrients for faster growth of the corn from germination to the knee-high stage. This means easier weed control, less covering of the corn plants, and a better stand.

When older type equipment places the fertilizer above the seed, it stimulates weed growth and adds to the difficulties of weed control. Deeper fertilizer placement eliminates this trouble.

Before you decide whether to use starter fertilizer at all, get soil samples tested. On low phosphorus soils, starter makes the corn use both soil moisture and nitrogen fertilizer more efficiently. It gets a big increase in yield, in addition to what nitrogen alone will do. And it helps the corn to mature earlier and more evenly.

On high phosphorus soil, properly placed starter fertilizer usually speeds up the early growth of the corn and thus makes it easier to cover the weeds. It may also, in some cases, help the corn to mature more evenly. But these benefits do not necessarily mean higher yield.

These facts mean that soil tests are essential. Get soil samples—several samples, to represent the different kinds of soil in each field—and get them tested. Then follow the recommendations on whether to use starter fertilizer or leave it off.

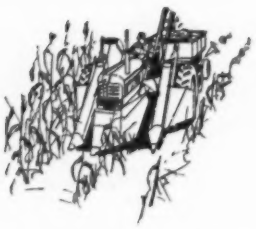
What about corn rootworm control? If fertilizer containing insecticide is applied with the split boot, it does a pretty good job of keeping off rootworms and a few other pests such as wire worms and seed maggots, but it doesn't get efficient fertilizer results.

If applied with the single boot attachment, along one side of the row, the fertilizer is effective but the insecticide protects only one side of the the row, leaving the other side exposed to rootworm damage. For best results with both fertilizer and rootworm control, apply each separately according to its own recommendations.

Chemicals May Allow Earlier Wheat Planting

Agricultural chemicals may break the back of one of the wheat growers' most troublesome problems. Two systemic chemicals, Thimet and Bayer 19639, have effectively controlled the Hessian fly in two years of testing by researchers at the Michigan State University Agricultural Experiment Station. Systemic materials are absorbed into the plant's system and kill the insect when it bites into or sucks the plant's fluids.

You Can Boost Corn Yields



Top yields year after year result not only from favorable weather but adequate fertility and good management. It's a matter of watching the fine points . . .

Condensed from
Wallace's Farmer and Iowa Homestead

Neil Harl

PLENTY of moisture at just the right time makes a big difference in corn yields. Folks need only to check weather and yield records to be convinced of this.

But in "good" years, corn yields vary tremendously even on the same types of soil. These variations are mainly due to things farmers can control.

Many farmers have found they can increase yields and come up with a lower per bushel cost as a result.

Seed

Ray Mitchell, Floyd county, Iowa, farmer and former Master Corn Grower, emphasizes the importance of seed. "We select hybrids by performance in yield tests," says Mitchell.

"Every year the Iowa Corn Yield Tests show a variation of several bushels per acre between hybrids in the same test," declares Oliver Knott, of the Iowa Crop Improvement Association.

Yield isn't the only consideration, though. Standability, moisture percentage at harvest, and dropped ears should be checked as well.

Tillage

Tillage methods are undergoing close scrutiny by corn growers interested in cutting the number of trips across the field. Every tillage operation reduces organic matter content of the soil. And adds to costs.

So farmers will be ahead to work the soil no more than necessary for a good seedbed and adequate weed control. And farmers planning to replace tillage equipment may want to consider methods of planting calling for fewer operations.

Fertilizer

Commercial fertilizer applications have been profitable on corn most years. Response has usually been greater on second or third year corn, especially for nitrogen.

Reprinted by permission from Wallaces' Farmer and Iowa Homestead, Des Moines, Iowa

Corn is a heavy user of nutrients. A 100-bushel crop requires about 150 pounds of actual nitrogen, 25 pounds of phosphorus, and 100 pounds of potassium.

Soil tests are still the best bet for figuring the most profitable amount of fertilizer to apply. Most Iowa soils are short on nitrogen. And phosphate and potash applications pay off on many corn fields.

Many corn growers prefer to plow down all except the starter portion. Response has been good and losses small. And application can be done before the rush of spring work.

Harry Meyer, Hancock county, Iowa, likes the early growth response from starter.

Placing the starter to the side and well below the level of the seed is advised now. Attachments for planters now in use are available. Better response and germination result from this method of placement.

For the older, split-boot method, agronomists recommend an upper limit of 30 pounds per acre of actual nitrogen and potash applied. Heavier doses of these soluble salts may reduce germination in dry years.

Another point to check in selecting starter fertilizer is water solubility of the phosphate portion. At least 50 per cent should be water soluble, say Iowa State College agronomists.

Planting

Planting is an all-important step in reaching bumper yields. Proper timing, rates, and depth all affect yields.

Rex Devore, Wayne county, Iowa, tries to time planting to escape as much corn borer damage as possible. "For this part of the state I figure that's about May 15 to 22," asserts Devore.

Earlier plantings are often hard hit by first brood borers. And second hatchings are attracted to later planted fields.

"The soil should be good and warm at planting time," states Mitchell. An average daytime temperature of 60 to 65 degrees or higher for a few days will warm the top few inches enough for speedy germination. Corn lying in cold, wet soil often falls prey to soil insects and diseases.

Planting depth is of real concern especially in a dry spring. Researchers advise planting just deep enough to insure moisture for germination.

"We have some evidence that less than 4 plants per hill may give top results," reports E. R. Duncan, Iowa State College extension agronomist. "Smaller numbers of plants in hills closer together seem to better withstand adverse conditions such as dry weather or low fertility," he explains.

Iowa State College specialists recommend a minimum of 12,000

plants per acre for light textured soils, 14,000 plants per acre for medium soils, and 16,000 plants for heavy soils. This assumes fertility and management geared for 100 bushels per acre.

But remember, not every seed planted produces a plant at harvest. Agronomists generally assume that 80 per cent will survive seed and stock losses.

"So plant 5 kernels for every 4 plants you want," advises Frank Schaller, Iowa State College agronomist.

Farmers shooting for top yields —150 bushels or more per acre— should plant 20,000 or more plants per acre at corn picking time. But fertility, weed control, and insect control must be top-notch as well.

Weeds

"You've got to watch those weeds," admonishes Devore. He prefers to go over the field once or twice with a rotary hoe while the corn is small. Some years this is followed by another trip with a weed sprayer.

"I generally cultivate twice at most—once if weeds don't present much of a problem," adds Devore. Researchers have found several cultivations may be unnecessary except to control weeds.

Pre-emergence weed sprayers —applied near planting time— are now used against broadleafed and grassy weeds.

This material is commonly applied in a band over the row. The corn then is 12 to 15 inches high before the first cultivation is necessary.

Soil Insects

Damage from rootworms, wireworms, and cutworms runs high some years. Soil insect damage shows up generally as poor stands and later as lodging from root damage.

Nearly two-thirds of the more than 1½ million acres treated in Iowa last year was with the insecticide mixed with the fertilizer. "We've been getting 90 per cent or better control with this mixture located on both sides of the seed and near the surface," reports John Lilly, State College entomologist.

But with fertilizer placed to the side and below the seed, tests last year gave at best only about 50 per cent control of corn rootworms.

Farmers deep placing their starter fertilizer may wish to broadcast the insecticide ahead of planting. Or they can apply it over the row with a special planter attachment. Surface applications should be worked into the soil immediately.

Farmers getting high corn yields year after year watch the fine points carefully. Shooting for top yields involves not only favorable weather conditions but adequate fertility and good management as well.

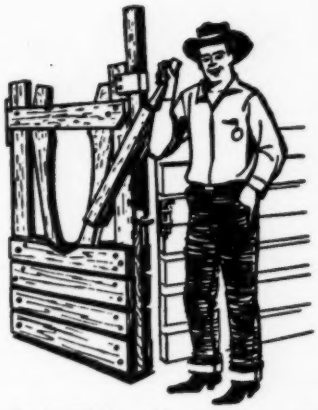
New for You . . .

THE EDITORS

High Moisture Hay Handler— If you have tried to put high moisture hay on to your mow dryer with a blower, you will like the new hay conveyor and spreader manufactured by Bolas Manufacturing Company, Fort Atkinson, Wisconsin. Coupled with an elevator, it makes chopped hay handling a one-man job, they say.

From the wagon, hay is elevated into the barn to the Bolas Conveyor, and into the Bolas Hay Spreader which evenly distributes the hay in the mow. This helps eliminate separation of leaves from the stem, and plugging of lines. The system is more efficient and faster than when using a blower, and only small electric motors are required to operate the elevator, conveyor, and spreaders.

Round We Go Again — Dairy cows have been milked on a "merry-go-round" Rotolactor and now they can be fed on a Round-the-Silo-Feeder manufactured by Badger Northland Inc., Kaukauna, Wisconsin. Fitting completely around a 16 foot silo the feeder will handle about forty head of cattle. Used in combination with a Badger Northland Silo Unloader, it makes a "push button" mechanical feeding system.



Quit "Wrassling" Your Cattle —It isn't good for them or for you. Get a new automatic, self-locking chute head gate worth $25.00 for only $17.95 and a box top. It's a Chas. Pfizer & Co. Inc., offer to encourage cattlemen to buy their "Stimplants", a concentrated source of stilbestrol. Send your check with the top cardboard flap from either a Stimplant Pellet Box or Stimplant Beef Implant Kit direct to Kent Co., Brooksville, Mississippi. You pay freight.

Internal Treatment for Cattle Grubs — It's now practical for every cattleman, according to Dow Chemical Company. They report adequate supplies of Trolene boluses. Reported results show an average of 90% control of grub infestations from use under field conditions. Trolene is Dow's trademark for this syste-

matic animal insecticide. The cost of treating an average feeder steer should range from one dollar to a dollar and a half. Science is sure wonderful. You can now treat them on the inside for what ails them on the outside.

Versatile Plastic Sheets are used by agricultural engineers at the University of Illinois over a simple steel frame to make a low-cost livestock shelter. Framework is ordinary steel fence posts with angle irons welded across the top for rafters. These frames are driven into the ground six feet apart, and pieces of two by two lumber are run across the top for bracing. Cost has been 13c a square foot of floor space. Shelters are excellent for calves, sheep, hogs and poultry but probably not rugged enough for full grown cattle. Get details by writing the University of Illinois, Department of Agriculture, Urbana, Illinois. Ask for Farm Buildings Tip Sheet No. 8—"A Low Cost Shelter."

USDA Rules Against Use of Virulent Hog-Cholera Virus— In a proposed amendment to USDA regulations governing the inter-state movement of swine, the use of virulent hog-cholera virus for vaccination will be prohibited. The amendment also prescribes the minimum dosage of modified live-virus vaccine that shall be used with anti-hog cholera serum. The amendment becomes effective June 6, unless valid protests against it are received before that date.

Corn has never been found growing wild anywhere in the world and the mystery of its origin has never been solved.

Individual Slatted-floor Calf Stalls— The University of Wisconsin in their Special Circular No. 17 gives complete step-by-step, illustrated plans to build a low-cost calf stall. The circular includes detail drawings and a complete list of necessary parts and materials. These stalls require 25% to 40% less space per calf than individual pens and 15% to 35% less space per calf than group pens. If you've had some trouble raising calves, don't miss this sure-fire aid to healthy calves. Write University of Wisconsin, Bulletin Room, Madison, Wisconsin.

Sheep Marking Made Easy— Livestock identification problems at breeding and sorting time may be eased by an aerosol fleece-marking formulation developed by DuPont. Harmless to animals, dye mark produced is stable to water but is removed easily by normal scouring processes. Provides pencil-like jet of dye which, at distance of 12 inches from animal, makes indelible mark about one inch in diameter. Write DuPont, Wilmington, Delaware.

The Dairy Outlook

Little change is foreseen. There will be slightly higher production and slightly lower prices; but good dairymen may make money . . .

Condensed from The Farmer

Gilbert Gusler

DAIRYMEN face a slightly less favorable year than in the past 12 months. They'll deliver a little more milk, consumers will have a little less money with which to buy it and government supports will be lower. Milk and butterfat prices probably will be down more than dairymen's costs.

All the changes are likely to be small. Most good dairymen will make some financial progress. By improvements in their management, some will have better net incomes than in the past year.

Expect Production Increase

Milk production is expected to be up slightly from the record 126.4 billion pounds produced in 1957. Output in the first quarter of 1958 was 30.2 billion pounds compared with 30.1 billion pounds a year previous. Dairymen have about 2% fewer cows in their herds than a year ago, but they are turning out more milk per cow. Numbers have declined in all but one of the last 13 years and are now the smallest since 1928. However, the cows have greater inborn capacity to produce and are fed and managed better so they produce more than ever before.

Average production per cow has been rising about 3% a year. It reached 6,162 pounds of milk and 235 pounds of butterfat in 1957. An increase of 2% or 3% can be expected again this year unless drought makes a drastic cut in pasture and feed crop yields.

Milk cows were fed an average of 1,945 pounds of concentrates in 1957, a new high record. This was an average of a pound of feed to slightly over three pounds of milk. The feeding rate thus far in 1958 has been slightly greater than a year previous. Record supplies of feed grains

Reprinted by permission from The Farmer, St. Paul, Minnesota

and hay are on hand and milk and butterfat prices encourage feeding for a heavy production.

Consumption of dairy products probably will be slightly larger this year. Growth of population will add about three million to the number of potential consumers. Wage and salary income is down slightly, but the change appears too small to have much effect on demand for dairy products. Lower supports will mean slightly lower average retail prices for milk and its products. Industry efforts to promote consumption by educational publicity and advertising will be continued.

When liquid fertilizers are subjected to low temperatures, there is danger that some of the plant food will salt out.

The school milk program will be continued another year. Part of the CCC support purchases will be donated to school lunch and other eligible institutional outlets and to the needy.

Although the gain in population made total usage about the same in the two years, consumption of milk and dairy products in whole milk equivalent per person was about 2% less in 1957 than in 1956. Per capita consumption of each of the major dairy products was slightly less in 1957.

Milk Consumption Steady

Consumption of fluid milk and cream per person in 1958 may be no higher than in 1957, according to USDA. Fluid cream use has been in a downward trend for several years. Lower supports are most likely to result in lower butter and cheese prices at retail; hence, consumption of these products may increase slightly in the year ahead.

In spite of promotional efforts and record high consumer incomes, total consumption per person of dairy products in whole milk equivalent has barely held steady in the last few years, but gains in population have increased total usage. Rising costs of processing and distribution have raised retail costs to consumers. Margarine is gaining a little wider market at the expense of butter and the possible association of animal fats with arterial disease is probably restraining consumption of both milk and butter by some older persons.

Export demand is not likely to be any better in the year ahead. Dairy production abroad is rising and shortage of dollar exchange and our higher prices hold down foreign ability to buy U.S. dairy products. CCC donations made up a substantial part of the dairy exports in the past year.

Production will continue to run ahead of commercial demand

at support prices, although CCC purchases may not be quite as large as in the year ended March 31, 1958, when they reached 215.3 million pounds of butter, 250.8 million pounds of cheese and 780.2 million pounds of nonfat dry milk.

Butter and cheese purchases were equivalent to 6.8 billion pounds of whole milk, or a little over 5% of production. They were 4% or 5% of production in each of the preceding three years.

Support prices set for the present year at 75% of current parity are $3.06 a cwt. for manufacturing milk of the national average fat test of about 3.9% and 56.6 cents a pound for butterfat, reductions of 19 cents and 2 cents, respectively, from the past year. Purchasing prices are 1¾ cents a pound lower for butter and nonfat dry milk and 2¼ cents lower for cheese than in the past dairy year. U.S.D.A. estimates that the price received by farmers for all milk of average test may be 12 to 14 cents a cwt. under the $4.20 a cwt. received in the past year, a drop of about 4 per cent.

Support at Legal Level

The law requires that the Secretary of Agriculture set the price supports between 75 and 90% of parity at the level he deems necessary to assure an adequate supply. Although the government probably will not have to buy as much as in the past year, its purchases to maintain the new supports will be substantial; hence, the support level is fully high enough to meet the standard set by law.

Number of milk cows, two years old and older on U.S. farms on January 1, was 22.4 million head, the lowest number since 1928.

Net cost to the government of the dairy support program, including the school milk and military programs, in the 1956-57 dairy year was $379 millions. It is likely to be still larger for the 1957-58 year by the time all the larger purchases made are disposed of. It will be somewhat less this year if purchases are appreciably reduced.

It will be up to the individual dairyman if he is to have as good or better a year in the next 12 months as in the last 12. Here are some suggestions:

1. There are still too many "boarder cows" in dairy herds. Net returns from cows of smaller breeds producing under 6000 lbs. and cows of larger breeds producing under 7,500 lbs. will be small. Milk production per cow averaged below 4,000 lbs in 4 states and below 5,000 lbs. in 13 states last year. More culling would also reduce the milk sur-

plus. Testing cows one day a month will help spot the milkers that don't pay their way. The present high beef market makes a good time to sell.

Within the ten years following World War II, the child population of the U. S. increased by more than one-third, reaching a record total of 55⅔ million at ages under 18 years in 1955.

2. Feed makes up 50 to 60% of dairymen's production costs. Growing and feeding more high quality legume hay and more silage will help cut down feed bills. Some cows are underfed and some overfed on concentrates. Feeding each cow according to her production will bring more milk per pound of grain used. Richer pastures through re-seeding with better mixtures, heavier fertilization and rotation grazing will save on harvested and purchased feed during the summer and extend the grazing season at both ends.

3. Variations in labor expense, the second largest dairy cost element, are tremendous. Cows handled with only 75 hours or less of labor a year will pay much more per hour for that labor than those requiring 125 hours or more. The variations are much wider than that. Stabling and milking facilities and feed storage arrangements play a large part in determining labor costs. Larger investment in equipment such as cleaned-in-line milkers, elevated milking stalls, bulk coolers and barn cleaners are necessary for some labor savings. Spreading such investments over more cows will reduce unit costs and help make them pay. Because of their uneconomic use of labor and facilities, small herds are fast disappearing. Around 20 cows are a minimum.

Trend to Continue

The longer outlook for the dairy industry appears to be "more of the same" as in the last few years: fewer but larger herds, rising production per cow, more mechanization of dairy chores, continuation of some form of price support with total production slightly ahead of consumption at the established price levels even though increasing population will be expanding the total market.

Looming upon the horizon is milk concentrate which is not likely to take over much of the fluid market in the near future, but may become quite important in the long run. By lowering consumer prices, it may enlarge the milk market. To the extent that it replaces fluid whole milk, it will tend to narrow the present wide spread between fluid and manufacturing milk prices.

Should You Store Corn?

Figuring costs and margins isn't as simple as it may appear . . .

IT COSTS from 27 to 33 cents a bushel to store $1.20 corn in a new crib for ten months. If you have storage facilities, cost will be about 23 cents. Here are Purdue University figures:

ESTIMATED STORAGE COSTS FOR 20 PER CENT MOISTURE CORN VALUED AT $1.20 PER BUSHEL

Cost Item	Storage cost per bushel Ear Corn for 10 months
	Cents
Use of new storage	4-10
Shrinkage due to moisture loss (corn reduced from 20 to 15.5 per cent moisture	9
Interest at 5% per annum	5
Extra handling	3
Losses — 1.5% for corn	1.5
Damage	.3
Insurance — $.40 per $100.00 valuation	.4
Taxes — $3.70 per $100.00 valuation, grain valued at 70%	3.1
Treating and conditioning	.5
Total with new storage	26.8-32.8
If storage is available	22.8

Loss of moisture content or shrinkage costs 9 cents a bushel, your biggest cost of storing corn. This loss is more than simply the change in per cent of moisture content. Corn shrinks more than 5 per cent when it changes from 20 per cent to 15 per cent moisture. There is a reduction in weight.

SHRINKAGE IN 1000 BUSHELS OF EAR OR SHELLED CORN DRIED TO 15.5% MOISTURE BASIS

Per cent moisture in 1000 bu. before drying	Bushels of ear corn at 15.5% moisture content	Bushels of shelled corn (15.5%) moisture content
35.	709	770
30	775	829
28	803	852
26	832	876
24	861	900
22	893	924
20	925	947
19	945	959
18	960	970
17	975	982
16	994	994
15.5	1,000	1,000

For Example: 1000 bushels of 22 per cent moisture ear corn will dry down to 893 bushels of 15.5 moisture ear corn. —Purdue University

Storing corn for a price rise doesn't always make money and carries some risk. Here's what happened to corn prices during eight seasons:

CORN PRICE CHANGES FROM HARVEST TO AUGUST OF FOLLOWING YEAR

Year	Nov. 15	Aug. 15	Change by Aug. 15	Remarks
1945-46	$1.11	$1.80	$.69	———
1946-47	1.27	2.19	.92	Small crop prospects for 1947
1947-48	2.19	1.91	-.28	Big crop prospects
1948-49	1.21	1.18	-.03	Bumper crop
1949-50	1.02	1.44	.42	———
1950-51	1.37	1.65	.28	———
1951-52	1.62	1.73	.11	———
1952-53	1.45	1.48	.03	General farm price decline
Average	1.40	1.67	.26	USDA Data

Your Prescription for 100-Bushel Corn

Here's how planting and fertilizing to Wisconsin's formula pays off in yields . . .

Condensed from Massey-Ferguson Farm Profit

BACK in 1952 University of Wisconsin specialists put out this challenge: *"If you'll do what we recommend—you'll grow 100 bushels of corn per acre."*

The 173 adventurous farmers who accepted this dare hit an astounding average of 124 bu. per acre *that first year.*

Thus was born the Wisconsin Pacemakers Corn Club, and the now famous "100-bushel corn prescription" which has pushed the state corn average to an all-time high of 65 bu. in 1956. Over a six-year period, 3,318 farmers from 42 Wisconsin counties — some far north in the 90-day corn area — have averaged 105 bu. per acre. Last year, despite bad weather, 552 Pacemaker members averaged 101 bu. per acre.

More important: "Farmers who closely follow every recommendation of the University are averaging 140 bu. of corn per acre," says Dr. Kermit Berger, Wisconsin soils professor. "They are growing corn at a cost as low as 35 to 55c."

Some farmers take the 100-bushel corn prescription in small doses — rather than farm-wide. Jack Caine, for example, whose story follows. Others like Wm. F. Renk & Sons take the whole plunge. In 1954 the Renks applied $36.68 worth of commercial fertilizer, plus 10 tons of manure on a 55-acre field. The payoff: 181 bu. of corn per acre and a cost per bushel of 49.6c. That year the Renks had 266 acres of corn that averaged 150 bu. an acre. Experience shows that, given a productive soil, you can go all the way the first year.

Jack Caine farms with his brother, Tom, on a 280-acre

Reprinted by permission from Massey-Ferguson Farm Profit, 1000 Empire St., Milwaukee 3

farm in Dane Co., Wis. The land is rolling, mostly second and third class land. Corn yields five years ago were about 50 to 60 bu. They decided to give the corn prescription a try in 1952, but only on a few acres. Their yield: 160 bu., "the most corn I ever saw," admits Jack.

The number of farm wives employed outside the home rose from 17 per cent of farm wives in 1950 to 26 per cent in 1956, the largest increase of any occupational group.

In 1953, they got a little bolder and side-dressed all of their corn — almost doubling their yields. In 1954, they had one field that hit 216 bu. In 1956, their farm-wide average was 115 bushels.

The real payoff for the Caines: "We've got a much 'bigger' farm today. We've doubled hog production, and now carry 100-head of Brown Swiss cows averaging 9000 lbs. of 4% milk. Our farm is much more productive, the soil has more tilth, we have fewer weed problems. Corn prescription has been a profit-maker for us," says Jack.

The Pacemakers program is based on soil testing and individual recommendations on fertilizing, planting, seedbed preparation, insect control and cultivation. The two most important recommendations, of course, are fertilizing according to soil test, and planting enough corn to get a stand at harvest of 16,000 to 18,000 stalks.

Farmers who follow the Pacemaker recommendations year after year find that after the first big gulp, fertilizer requirements are much less in succeeding years. Here's the prescription:

1. Test your soil. This is a must or otherwise you're shooting in the dark.

2. Figure your fertilizer needs. This takes pencil work. Two things to remember: First, a 100-bu. corn crop contains 150 lbs. of nitrogen (N); 25 lbs. of phosphorus (P) which is 60 lbs. of fertilizer phosphate (P_2O_5); and 100 lbs. of potassium (K) which is 120 lbs. of fertilizer potash (K_2O). The crop must get this much from the soil, from manure, and fertilizer you apply.

Second, there's a BUT. Recently research shows that the crop only gets about 40% of the nutrients the soil test shows. So you've really got to be sure that the plant has available *more than twice the amount it will actually take up.*

This table shows exactly how much your first corn crop can get from the three nutrient elements:

Source	First Crop Gets: N	P	K
Soil	40%	40%	40%
Manure	30%	30%	50%
Fertilizer	60%	30%	50%

After you get your soil test, you're ready to figure your fertilizer needs. The table following shows an actual soil test from a typical field — and how the farmer used manure and fertilizer to build up fertility for 100 bu. yields and higher net profits.

Substitute your soil test results for the figures here which show 200 lbs. of available nitrogen, 60 lbs. of phosphate and 120 lbs. of potash. If you plow down heavy corn stalks, deduct 100 lbs. from this column.

This farmer had manure, so he entered it in the appropriate column. You do likewise if you have it. Then he figured what else he needed to bring up the totals to 150 lbs. of nitrogen, 60 lbs. of phosphate, and 120 lbs. of potash — allowing of course for the fact that the plant will get only a certain percentage. You can figure your needs exactly the same. If you do not have manure, then you will need to add another 500 lbs. of 10-10-10.

3. Place your fertilizer. Disk in manure and fertilizer you've broadcast before plowing. Place starter fertilizer 2 inches to side and 2 inches below seed. When side-dressing solid forms of nitrogen, apply when corn is a foot high. Put 3 inches deep, and 8 to 12 inches from row. When anhydrous ammonia is used, apply earlier if possible to avoid root pruning.

4. Go easy on soil. Work as little as possible.

5. Plant enough seed. You cannot get a high yield unless you have 15,000 to 18,000 stalks at harvest. You must plant 10 to 15% more seed than you expect to harvest. The table below shows different planting patterns. Test your planter on a hard surface to see how many kernels you are dropping. Never drive over 3 miles per hour in the field if you want an even stand.

How to Fertilize for 100-Bushel Corn Yields

	Pounds NITROGEN		Pounds PHOSPHATE		Pounds POTASH	
	In Soil	Crop Gets	In Soil	Crop Gets	In Soil	Crop Gets
Soil test shows	200	40% or 80	60	40% or 24	120	40% or 48
You must add:						
10 tons manure	100	30% or 30	50	30% or 15	100	50% or 50
600 lbs. 10-10-10	60	60% or 36	60	30% or 18	60	50% or 30
400 lbs. 3-12-12	12	60% or 7	48	30% or 14	48	50% or 24
Total crop can get	153 lbs.		71 lbs.		152 lbs.	
Needed for 100-bu. yield	150 lbs.		60 lbs.		120 lbs.	

How to Plant for 100-Bushel Corn Yields

Distance Between Rows	Kernels Spaced	Hilldropped Two Kernels	Hilldropped Three Kernels	Kernels Per Acre
38 in.	9 in.	18 in.	27 in.	18,400
40 in.	8 in.	16 in.	24 in.	19,600
42 in.	8 in.	16 in.	24 in.	18,700
Checked — 38" by 38", and 4 kernels to the hill				17,600

6. Control pests. Some seed corn now comes treated as protection against insects. Get starter-fertilizer that contains heptachlor or aldrin to control wireworms, white grubs, and corn rootworms. New chemicals are making weed control easier, with fewer cultivations.

Follow these recommendations, get a break from the weather, and you may go well over 100 bu. of corn to the acre this year. Why don't you try?

Nitrogen Doesn't Increase Corn Moisture

Farmers looking for ways to avoid the soft corn problem in the future won't help it any by applying less nitrogen fertilizer. In fact, nitrogen is more likely to be a help where the high-moisture corn problem is concerned.

Field tests at the University of Minnesota in recent years have shown that average ear corn moisture in late September is about the same in corn receiving heavy nitrogen doses as it is in corn receiving either no fertilizer at all or a no-nitrogen fertilizer.

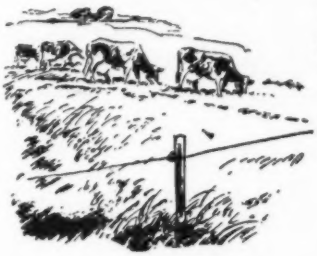
J. M. MacGregor, soils scientist, says this holds true whether the nitrogen comes from ammonium nitrate, anhydrous ammonia or urea fertilizer.

In 1955 tests, he said, scientists compared unfertilized corn with plots receiving rates of 60, 120, 180 and 300 pounds of nitrogen per acre, alone and with 40 pounds each of phosphate and potash per acre. None of the fertilizer rates changed the corn moisture percentage by more than 1 per cent.

Tests in 1956 showed similar results with urea nitrogen. The only difference from the earlier tests was that applying 60 pounds urea nitrogen along with 40 pounds each of phosphate and potash per acre resulted in 3 per cent less moisture in the corn.

Actually, proper fertilizing can help avoid a soft corn problem, MacGregor said. He reasoned this way: Excessive moisture often results from corn freezing before it matures. Corn plants that receive an adequate supply of plant nutrients will grow faster and therefore will be more likely to get ripe before the first frost.

Control Grazing and Get More Pasture



Canadian tests show 26% more pasture from daily strip grazing. First results indicate little difference between strip grazing and green feeding . . .

Condensed from The Country Guide

V. S. Logan

GOOD pasture has been called the ideal feed for dairy cows. It is one of the dairy farmer's most important assets, but few may realize the losses that can occur through careless handling.

It has been estimated that with common methods of grazing, approximately 40 per cent of the available forage may be wasted by trampling, animal droppings, and by animals lying down.

Cows also waste a lot of energy that might otherwise be converted to production, by roaming over the pasture to graze the more choice areas first. A further consideration is the control of seasonal pasture growth. Records of monthly growth of common pasture mixtures show that up to 80 per cent of the total growth in a season may occur before the end of July. A good pasture management program can do much toward overcoming these losses, and also maintain the forage in a more nutritious state.

One program is rotational grazing over sub-divided areas of the pasture and harvesting the surplus grass. This has been an effective method for increasing the overall productivity of the pasture. Movement of stock to new sub-divisions is arranged to provide a rest period of from 2 to 3 weeks for each plot for adequate aftermath recovery.

With the development of the electric fence a system of controlled grazing, has gained favor. It has been tested at the Central Experimental Farm, Ottawa, Canada, on pasture in a 5-year crop rotation, and is being compared with other management systems at branch farms.

Daily strip grazing at Ottawa consists of confining cows by means of an electric fence to an area which will provide grazing for 1 day. The fence is stretched between two permanent fences

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along the advance side of the day's grazing area. A second fence is strung behind the cows to provide for aftermath recovery.

An average of 129 man-hours per cow is needed to care for a 10-cow herd during one year, while only about 80 hours per cow are needed for a 30-cow herd.

The advance fencing can be quickly moved to the new position each day by one man. This is usually done when the cows are returned to pasture following the morning milking. The rear fence is moved at weekly intervals, leaving some space in addition to the day's feed allotment to reduce contamination of the fresh grass by droppings. As the aftermath recovers sufficiently on the initially grazed area, cows are moved back to it and begin again. At this time, surplus grass from the ungrazed area is harvested for silage or hay.

Starting the grazing season usually in the third week in May, daily strips are stocked at the rate of approximately 60 cows per acre per day. As the rate of grass growth increases, the stocking rate is increased to as high as 125 cows per acre per day. The distance the forward fence is moved each day, which governs the stocking rate, is gauged by how well the previous day's allowance was cleaned up. Daily milk production is also used as an indicator that a sufficient amount of grass is provided.

At certain periods of the season, when aftermath recovery is slow, the herbage being grazed may pass the succulent stage and become less palatable. The cows then have a tendency to skim off the leaves and ignore the stemmy material. Also during the second, third, and other cycles of grazing, rank tufts of grass about the droppings will be refused. It was found that if this material was mowed just before advancing the rear fence, cows would consume most of it.

Experiments over 3 years at Ottawa, in which daily strip grazing was compared to conventional free range grazing, resulted in an average of 26 per cent increased productivity for strip grazing over the free range method.

Cutting the pasture grass and hauling it to cows in the stable or dry lots is another method of pasture management that is attracting increasing interest. This mechanical or zero grazing has advanced with the development of suitable harvesting machinery. It is the most efficient system of management for conserving grass, but may be too costly except for large dairy units.

A project to compare mechanical grazing with strip grazing is now being conducted at Ottawa. This experiment is designed to compare milk yields, grass productivity, rate of grass consumption, and the effect on body gains under the two systems of pasture management. Records are also being kept of the comparative labor and equipment costs. The results to date indicate that there is no difference between the two grazing procedures with respect to total season milk yield.

While grass productivity varied between the two systems, the differences were not great. The mechanically grazed cows showed substanitally greater body weight gains than those on daily strip grazing. The cost of mechanical grazing was appreciably higher than for the strip grazing. Since this experiment has not yet been completed, these findings can only be considered as indicating trends under those conditions.

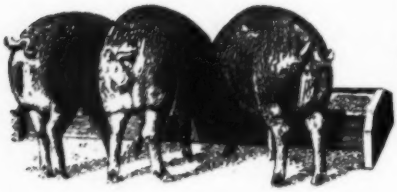
Of the methods of controlled grazing discussed here it may well be that one system is better suited to a particular set of farm conditions than another. For example, ordinary rotational grazing may be satisfactory where the water supply is available from a brook or lake. The strip grazing method is well adapted to small herd requirements, while mechanical grazing may be the more economical means of managing advanced pasture growth. Careful attention must be given to stocking rates to avoid over or under grazing. Too close machine cutting will retard aftermath recovery.

The Good Farmer

by G. B. Gunlogson

The land has been here for untold ages, but this farm with its fields and crops and cattle came from minds of men. Every year these acres become more productive as our skill and our ideas grow. Even the songbirds and wild flowers bring us new riches as we come to see and know them better. With renewed inspiration, I shall make still greater this heritage of land and living things.

Selling Hogs—Year-Round in Batches?



Growing hogs on contract or concrete isn't a sure thing. Watch these stumbling blocks to shorten the odds . . .

Condensed from Farm and Ranch

Bill Kennedy

ELEVEN hog specialists, from nearly as many states, were sitting in informal, evening session during a recent farm convention. They were batting around the busy subject of new trends in hog production methods.

Their enthusiasm varied widely over the renewed interest of farmers in close-confinement, concrete-pen feeding, and nearly as much over the turn toward more "contract farming" and integration in the hog business. Opinions as to how far these would develop in the industry ranged from a "passing fling," to convictions that they would go "even further than they have in broiler production."

While there were few points on which there was complete agreement among these experts, there was general head-nodding and harmony on this score: "A farmer going into this 'production-line' type of hog operation had better learn enough about it to do it right—or he'd better watch out!" It's not the same as running a few shoats in a field of corn.

Roy Godsey, of Virginia Polytechnic Institute, added up his convictions about like this: "Only one out of four of these operators will stay in business four years; the rest will drop out."

Others couldn't agree that the casualty rate would run that high. But the consensus was that growing hogs batch after batch, in pens without pasture, is a specialized job — and demands special handling.

Asked why he thinks it will take four years to get the "shoe clerks" out, Godsey said it will require that long for the five big pitfalls to trap them all. He's sure some growers will get out the first time the price weakens —and he figures there'll always be "com-ers and go-ers," just like in the broiler business. But some will go down slowly.

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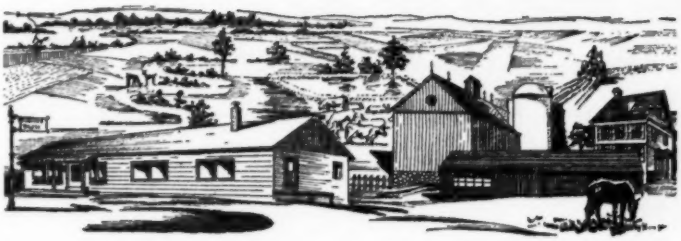

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The swine specialist lists these five big hazards: Price fluctuations, inefficient labor, disease, sorry pigs and lack of home-grown grains as a feed base. Then he told how to shorten the odds of going broke:

Farmers needing cribs or bins for grain storage can secure five-year, four per cent loans through County Agricultural Stabilization and Conservation (ASC) offices. Farmers also can obtain financing for drying equipment.

● A Good Hog Man

Whether you handle the job yourself or hire a man, "just another farm hand" won't do. He needs to know hogs, from experience — know them well enough to walk into a feeding "parlor" and spot things *about* to go wrong, and know what to do about them. He's got to know how to take care of hogs, be willing to work and stick close to the job.

It's not so much a matter of *more* work with concrete pen feeding (some farmers claim it takes less.) But the know-how you've got to have. Feed companies—now integrating many of these operations—recognize this, and offer close supervision for their feeders, through field men.

● Disease Prevention

Control disease mainly through sanitation. Following older hogs with little pigs in unclean quarters has always been risky business. At the same time, a good concrete pen, well drained and washed down with a hose daily, and with a good manure-handling system outside, is one of the cleanest hog set-ups you can have. (Liver worm damage, for example, has been cut to almost zero in some of these operations.) Manure handling has been one of the problems, so far—especially in hot weather, after several batches of pigs.

Total investment in modern dairy farms has increased considerably in recent years. Most of this increase is due to bulk milk tanks, pipeline milkers and other labor-saving equipment.

● Good Pig Supply

Some of the "batch" producers are raising their own pigs. Others are buying from neighbors, who are falling in line by "specializing" in pig production. Either way is good—so long as you know the pigs you use (type, thriftiness and reputation). And so long as you plan ahead to be assured of the supply you need. Growers have long since proved the folly of feeding poor starters —and of being careless about where they're bought.

● **Feed Supply**

It's Godsey's theory that the grower who doesn't produce his own grain, for use with commercial feeds, will eventually find himself in trouble. Other livestockmen, however, point to the price of feeds and claim a farmer can buy it all and still make money. In the end, it boils down to the efficiency of your own operation and the feed-hog price ratio at your farm. It changes with the season.

When prices go down, the grower who uses a wide profit margin as a cushion on which to ride out the tide is the one who will stay in business, Godsey concludes. And you can't have a wide margin of profit without the four "needs" listed above. Whether this new approach to pork production takes over the industry, or turns out to be merely a Southern supplement to it, they're good rules to go by.

How About Ape That Can Do the Chores?

If we tackled the problem of breeding animals for brains with the same enthusiasm that has been devoted to breeding dogs of surrealist shapes, we could eventually produce assorted models of useful primates ranging in size from the gorilla down to the baboon, each adapted for a special type of work.

It is not putting too much strain on the imagination to assume that the geneticists could produce a superape able to understand some scores of words and capable of being trained for such jobs as picking fruit, cleaning up the litter in the park, shoe shining, collecting the garbage, doing household chores and even baby sitting. (Though I have known some babies I would not care to trust with a valuable ape.)

Many jobs, such as street cleaning and the more repetitive types of agricultural work, it could do unsupervised, though it might need protection from those egregious specimens of Homo sapiens who think it amusing to tease or bully anything they consider lower on the evolutionary ladder.

For other tasks, such as paper delivering and dock laboring, our man-ape would have to work under human overseers.

—Arthur C. Clarke, in Harper's

Beef Cow Herd in the Corn Belt?

Few cow herds show a return above costs. A beef feeding program, in most cases, brings more profits . . .

Condensed from
National Live Stock Producer

Rex Beresford, Iowa State College

THE feverish demand for stocker and feeder cattle in late 1957 and the jump in feeder prices which accompanied it has revived interest in beef cow herds in the Corn Belt. I have received numerous letters seeking answers to questions which have been debated for the past 70 years.

"How long are these high feeder prices going to last?" "Will they ever come back in line with fat cattle prices?" "Wouldn't it be better — and safer — to keep a beef cow herd and raise calves to feed, or even sell as feeders, than to try to buck the crazy ups and downs of the feeder market?"

Beef Cow Interest Fluctuates

Unfortunately we have never been able to find pat answers to such questions. Interest in beef cows in the Corn Belt has gone up and down roughly with the rise and fall of total U. S. cattle numbers—the cattle cycle. When cattle numbers have been low in relation to feed supplies and beef demand, feeder prices have gone up; feeding profits usually have shrunk and feeder cattle apparently were being produced at a profit under Corn Belt conditions. This made the beef cow look good to the disgruntled cattle feeder.

So new herds were started, established ones enlarged and Corn Belt beef cow numbers went up.

For example, during the last rise in the cattle cycle—1949 to 1956—beef cow numbers in the Corn Belt increased roughly 35%. With the high cattle numbers of 1955-56 and early 1957, and relatively cheap and plentiful feeders, the interest in Corn Belt cows started to decline and numbers have gone down somewhat. But they still are relatively high.

Let's take a look at some of the factors behind the present situation. The current cattle cycle hit its peak of 97.5 million head on January 1, 1956. The

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expected upswing in cattle numbers was shortened somewhat by widespread severe drouth over much of the range country, the Western Corn Belt and even in the South and Southeast. A considerable liquidation of breeding herds was forced in the worst of the drouth areas; the final years of the cycle reaching a near disaster situation in 1956-57. This held the peak of the cyclical upturn at a level of 2 or 3 million head lower than had been predicted and shortened the upward trend by perhaps one or more years.

U. S. Department of Agriculture experts forecast a long-range increase in demand for timber. By 1975, they say, demand may increase by 25 to 40 per cent.

Due to the combination of high cattle numbers and drouth occurring at the same time, prices of cows, grass cattle, low grade slaughter cattle and feeder cattle, all remained relatively low. The supply being forced on the market was large in proportion to demand. And large supplies of cheap broilers and pork on hand didn't help the cattle situation. For several years the producer of feeder cattle was up against a buyer's market.

The situation might have been worse except for the fact that much of the increase in cattle numbers during the rise in the cattle cycle occurred outside the Great Plains area—in the South, Southeast and in the Corn Belt states. And while there was some drouth-caused reduction in breeding herds in the Western Corn Belt, it is probable that such reductions occurred because of relatively cheap feeders rather than from feed shortages. As for the South, neither drouth nor lower prices has succeeded in stopping a continuing rise in cattle numbers. The South is the only section showing more beef cows in 1958 than in 1956-1957.

Rains Changed the Picture

But when the rains came in the spring and summer of 1957, there was an almost overnight change in the cattle picture. As the grass and feed crops began to grow again, and water supplies were replenished in the West and Southwest, the pressure to sell was relieved. In fact, it soon was turned into a strong demand for breeding and stock cattle to rebuild depleted herds and fill empty pastures.

At the same time the fed cattle market was helped by reduction in slaughter of cows, two-way grass cattle and calves. The hog supply was in the short end of its four-year cycle which tended to strengthen beef demand. Feed grain and roughage supplies were

heavy throughout the Corn Belt and in the new grain sorghum belt in the fall of 1957. Wheat pastures were lush. Vast quantities of wet corn and sorghum added to the pressure. So demand for feeder cattle plus the restocking pull changed the buyer's market of the previous three years into a seller's market with real punch.

In past cattle cycles, it has required from 6 to 8 years to climb from the low production point to the peak, and from 5 to 7 years to go from the high point to the following low. The cycle behavior of these previous cycles indicates a build-up to peak about every seven years.

Cycles Average 15 Years

Beef cycles swing from high to low and back again about every 15 years. The present cycle is poised for a mild downswing toward a cyclical low in 1960. Each of the last two cycles had downswings of only four years as compared with 8 to 10 year drops in earlier cycles.

As suggested earlier, the drouth prevented as high a peak as was expected and started the downturn a year or more sooner. From a low of 77.9 million head in 1950, cattle numbers rose to a high of 97.5 million in 1956 and had dropped back to 94 million January 1, 1958. Where it goes from here is a matter of considerable guess work. The weather can be an important factor. If, as many appear to believe, the dry weather cycle is over and we are due for a number of years of normal or above average rainfall over most of the country, this could be the shortest downturn in cattle numbers in history.

The most effective time to apply an annual application of fertilizer on alfalfa is after the first cutting, say Purdue University agronomists. Alfalfa is a heavy potash user so plant food with an analysis of 0-10-30 or 0-10-20 should be used.

A marked reduction in cow, heifer and calf slaughter, all heavy in periods of liquidation, is usually the first sign of a check in declining numbers and a beginning of another build up.

Cow, heifer, and calf slaughter all showed increases from 1956 until mid-1957. Since then, there has been marked decline in both cow and calf slaughter. All cattle slaughter has declined, but fed steer and heifer slaughter has been maintained at a higher rate. As a matter of fact, the interest in and demand for feeding cattle has helped maintain the number of calves, steers and heifers in the cattle inventory longer than normal thereby preventing an earlier and sharper cyclical decrease in total cattle numbers.

The result was a shift from breeding to feeding—not a further overall expansion of numbers. Although short lived — this trend tends to maintain fed cattle supplies for a time even when total cattle numbers decline. Their final disappearance in the year's inventory tends to counteract any increase shown from increased holding of cows and calves. So it is quite likely that January 1959 may again show some further decline in total cattle numbers.

Home, Sweet Home: Don't work too hard making your guests feel at home! If they wanted to feel that way, they would have stayed there.

But by 1959—60 at the latest, it seems logical that we may have turned the corner and we should be well on our way toward another, probably shorter than usual, upswing in cattle numbers. During the early part of that period, probably for the next three or four years, most signs indicate strong demand for breeding and stock cattle, and relatively high prices for all cattle.

Expect High Feeder Prices

My guess may be wrong, but I do not look for much of a buyer's market for feeders during the next three or four years. Depression, or drouth, of course, could change the picture materially. But all cattle prices, feeders along with the rest, are likely to stay on the strong side during the early years of a new upturn in the cattle cycle.

Obviously, not every Corn Belt farmer desires, or should attempt, to handle beef cattle. A liking for cattle and considerable skill in handling them is probably the first requisite for success. Given this, the next most important factor is the choice of a program which fits the farmer's situation. Beef cattle offer various choices as to programs. There is a beef cattle enterprise which may be tailored to fit almost any Corn Belt farm situation.

The beef cow herd has some appealing features. The small feeder's annual anxiety, nuisance, and risk involved in buying stocker or feeder cattle is eliminated. Labor requirements with a cow herd are low. Quality can be a matter of your own choice and efforts. Many of the cow herds established in recent years are in the hands of older farmers who are willing, if necessary, to accept less than maximum income in exchange for less work and worry.

But the fact remains that all you can hope for in the way of return on your investment and for the feed and other costs involved in the year's keep of the beef cow is a 450 to 500 pound calf worth about as much as one

would cost on the feeder market. It takes a lot of feed to carry a beef cow for a year. If you have high grade hay and pasture and grain the chances are that more profitable uses could be found for these feeds if you look for them.

Feed Requirements Are High

Specialists at Clemson College, S. C., sum it up this way. To produce a pound of salable weight on a weanling calf weighing 450 to 500 pounds, including the year's feed for the cow, requires 14.2 pounds of total digestible nutrients. By finishing such a calf to 885 pounds on good roughage feeding over winter, followed by summer grazing and a short finish on corn, this was reduced to 10.6 pounds of T.D.N. per pound of finished weight. Let someone else keep the cow, and you buy the feeder calf in the fall. Handle in the same way as the home raised steer, and 7.3 pounds of T.D.N. per pound of finished weight will do the job.

One thing is sure. For a beef cow herd to pay out under most Corn Belt situations, the yearly feed costs for the beef cow must be kept as low as possible. And herd quality must be high. As now managed, many cow herds show little or no return above costs.

In general, the beef cow herd of 30 or more, is best suited to the larger farm with considerable acreage in permanent pasture and with plenty of cheap roughage available for winter feed. Cow herds don't work so well on better land where good rotation pasture and higher grade roughage makes up most of the feed supply. Valuable feeds such as corn, corn silage, alfalfa hay and high grade rotation pastures will give considerably higher returns when fed to growing or fattening young cattle than when used to maintain a commercial breeding herd. However, many relatively small sideline herds of beef cows—25 head or less—are maintained at low cost and with some profit as clean up squads on average or larger sized farms to make use of low grade feeds.

An idea which may find a place on large, all or mostly tillable, farms is being tested by Iowa Experiment Station. An 80 cow commercial beef herd is being carried on a 160-acre all crop land farm, plus 70 acres of rough land bluegrass pasture. Through the winter, the herd is maintained on cornstalk silage, minerals and a little supplement. Green chopped forage is fed from May to September and cattle get a few weeks of meadow aftermath pasture in the fall.

Bluegrass Pasture is Used

One-third of the herd is carried on the blue grass for comparison with the dry lot groups.

The idea is to keep feed costs at a minimum and save the corn grain and high grade hay for feeding out the calves. Results so far are not conclusive. They do indicate possibilities under conditions where size of farm and available capital permits the required heavy investment in machinery, equipment and labor costs. But so far, pasture summered cows have a better record as to yearly feed costs per calf produced.

In the past, the average small farmer who tried to carry commercial beef cow herd as a major live stock enterprise found slow going and small income in relation to capital invested and feeds used—except in brief periods of cattle scarcity and high feeder prices. A well chosen cattle feeding program suited to feed situation in most cases brought considerably higher average returns.

On the other hand, the man on the larger farm, with considerable roughage and grass for a sizeable herd of cows, may find such a herd reasonably profitable in combination with cattle feeding or other live stock enterprises. One factor that may give the Corn Belt beef cowman a better break compared with buying feeders is the increasing competition from the expanding Western and Southwestern feeders for the range produced feeder output.

Another factor which may have some bearing on returns from cattle feeding as against the Corn Belt cow herd must be considered. We will have large cattle numbers even at the low point of the cycle, (we now have nearly 94 million cattle compared with only around 78 million in 1949.) But feeder prices are likely to be supported by restocking and a strong demand. This could mean that feeding for the gain may be more important than margins for possible profits in cattle feeding. If this occurs, it will put the cowman and the cattle feeder on a more nearly even basis.

Milk In Big Bottles

More and more families are discovering the convenience of buying milk in larger containers. A report by the U.S.D.A. shows that 40 per cent of family purchases of whole milk during November 1957 were in half-gallon containers, compared with 22 per cent so purchased in November 1954. Almost 93 million quarts of whole milk were purchased for home use in gallon containers, almost half again the volume bought in gallons three years earlier.

Chemical Controls for Corn Insects

Here are ways to fight back at insects attacking your corn crop . . .

Condensed from Kansas Farmer

Dell E. Gates, Kansas State College Entomologist

MANY effective treatments now are available, so it no longer is necessary to plant your crops and feel at the mercy of insects!

Here are the latest recommendations for battling insects attacking your corn crop, as outlined by Dell E. Gates, Kansas State College Extension entomologist.

Grasshopper: Does most damage in May, June, July and August. Spray infested margins with Aldrin or Heptachlor (⅛ to ¼ pound per acre); or 1 pound Chlordane, or 1½ pounds Toxaphene, or 1 to 2 ounces of Dieldrin per acre. Insecticides should be applied to field margins early in season to avoid contamination of stover or ensilage.

Corn Leaf Aphid: Does most damage in midsummer. No practical control.

Southwestern Corn Borer: Does damage in June and September since there are 2 generations a year. Expose stalk roots to winter weather or substitute sorghum for corn as means of control.

Fall Armyworm: Damage comes in July, August, September. If corn is less than 18 inches high, use any one of following treatments: 1½ pounds DDT to acre; 2 pounds Toxaphene; ¼ pound Dieldrin; ½ pound Heptachlor; 3/10 pound Endrin. If corn is silking, use 1½ pounds DDT or Toxaphene per acre.

Garden Webworm: Damages leaves or plants less than 18 inches high in early summer. Use 1½ pounds Toxaphene per acre or 2 pounds DDT.

European Corn Borer: Overwinters as larvae in stalks. First generation out in June, second one in August-September. Control by following medium date of planting. Control of first generation: if plants are more than 35 inches extended height with 50 or more egg masses per 100 plants, or show feeding in 75 per cent of whorls, apply 1½ pounds DDT spray or 5 per cent granules at 12 pounds per acre

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applied by ground or 20 pounds applied by air.

Corn-Ear Worm: Damage occurs June to frost. No control for field corn.

WARNING!

The author issues the following cautions in following above recommendations:

DDT—Do not ensile DDT-treated field corn. Do not feed treated forage to dairy animals.

Toxaphene—Corn sprayed with Toxaphene cannot be used for feed for livestock.

Toxaphine granules—Toxaphene at 2 pounds per acre can be used with following limitations: Do not feed ensilage from treated corn plants to dairy animals or animals being finished for slaughter. Do not allow dairy animals to feed upon treated corn stover. Take meat animals from treated stover at least 4 weeks before slaughter.

Corn Rootworm (Western, Northern and Southern): Damage to crop by larvae in May, June; adults in July, August. Choice of 3 controls: (1) crop rotation for western or northern species; (2) listed corn; band treatment sprayed in lister row at subsoiler, or fertilizer mixture; use ½ pound of Aldrin or Heptachlor or 1 pound of Chlordane per acre; (3) surface planted: broadcast spray, disked immediately; use 1 pound of Aldrin or Heptachlor per acre, or 2 pounds Chlordane or ½ to 1 pound BHC per acre.

Corn Seed Beetle: Damage at planting time. Treat seed with Aldrin, Heptachlor, Dieldrin or Lindane at rate recommended by manufacturers, and follow instructions.

Farmers should aim for a total gross income about double the net earnings they want to make.

Seed-Corn Maggot: Damage at planting season. Seed treatment. Double the rate used for corn seed beetle. For heavy infestations use treatment recommended for corn rootworm.

White Grubs: Damage during growing season. Rotate with legumes.

Maize Billbug: Damage at planting time. Two treatments: (1) destroy sedges and rotate crops; (2) use Dieldrin at rate of ½ pound per acre or Aldrin at rate of 2 pounds per acre.

Cutworms: Damage during May and June. Choice of Toxaphene at 2½ to 3 pounds per acre or Dieldrin at ½ pound per acre.

Stalk Borer: Damage in May and June. Spraying weedy margins with grasshopper sprays at corn-planting time may reduce populations.

Chinch Bugs: Bugs migrate before small-grain harvest. Spray borders while some green plants still are in small-grain field. Ap-

plication must be made 7 days before small-grain harvest. Straw of small grain should not be fed to livestock for 30 days or shipped interstate. Choice of 2 treatments: (1) spray barrier 2 to 4 rows wide with ½ pound Dieldrin per acre between small-grain and corn field; (2) for field infestation, spray Dieldrin at rate of 1 pound per acre or Toxaphene at rate of 2 pounds per acre, and direct spray to base of plants.

How Your County ASC Committee Measures Corn in a Crib

Here is the procedure used by government agencies to compute the number of bushels of ear corn in a crib, shelled corn in a bin and other grain in a bin:

1. Multiply the length x width x height to obtain the gross cubic feet of the crib or bin.
2. Subtract deductions for vents, studs, improperly filled ears, excess stalks and husks to arrive at the net cubic feet of the crib or bin.
3. For ear corn in crib not less than one year old.
   Net cubic feet x factor 0.4 equals bushels of ear corn in crib (Gross bushels).
4. For ear corn in crib one year or more.
   Net cubic feet x factor 0.4444 equals bushels of ear corn in crib (Gross bushels).
5. The gross bushels are then adjusted by the moisture factor as follows:

	Multiply gross bushels by:
15.6 to 16.5% moisture (both inclusive)	98%
16.6 17.5	96
17.6 18.5	94
18.6 19.5	92
19.6 20.5	90

   Over 20.5 — No loan
   Multiplying above % by the gross bushels gives the net bushels.
6. If you are measuring a circular bin obtain the cubic feet by multiplying the circumference by .31831 to get the diameter. The diameter is then squared and multiplied by .7854 to obtain gross cubic feet. Then proceed as outlined under number 2.
7. Under number 3 & 4 above use factor 0.8 for all grains other than ear corn and proceed as outlined under number 5.

When Does Dairying Show a Profit?

In this study, the average herd broke even financially. How about yours . . ?

Condensed from Western Dairy Journal

E. M. Morrison,
Utah State University

IF YOU are a dairyman at heart and have facilities that can be reasonably well adapted to dairying you can make money in the business.

At least that's the outlook after studying 181 milking enterprises in the state of Utah. You will make money if you qualify as a grade A producer, keep a minimum of from 25-30 cows and maintain production per cow of at least 350 lbs. fat.

These statements are based on a study made by Utah State University of 181 farms in the winter of 1956-57. Records of 60 dairy farms in Sanpete County and 121 in Cache County were involved. In Cache County, 73 were from grade A producers and 48 were of producers of manufacturing milk. The study included only the milking enterprise. This means that each enterprise was charged for each heifer that freshened at market value. The enterprise was credited for a sale whenever a cow was sold. The enterprise was also credited with the value of a 5-day-old calf according to its quality. The researchers did not concern themselves with the problems of raising replacements but the study does have replacement costs or herd maintenance costs included.

Costs, Receipts, and Net Returns

The study was interested primarily in finding total costs, receipts and net returns from dairying. We also wanted to know what was associated with financial success in dairying.

In order that a producer might know his costs, we made a charge for everything that was required for production no matter who supplied it. All feeds, for example, were charged at market price at the farm whether grown on the farm or purchased. We credited the labor of the operator and his family at $1.10 per hour. We charged interest on all money invested in the dairy unit at 5% per annum for real estate

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capital and 6% for all other.

We included five items as receipts:

1. Value of the milk sold.
2. Farm market value of milk fed on the farm or used in the home.
3. Value of the calf at five days of age.
4. Value of manure calculated on the basis of fertilizer elements.
5. Total increase in inventory value where it existed.

The USDA reports that milk producing value per acre for early cut hay was 6,330 pounds. If the crop remained unharvested until full bloom, digestible nutrients per acre produced only 3,970 pounds of milk.

With total receipts and expenses as we have listed them, we can measure returns in several ways. If we subtract total expenses from total receipts, the net return was $6 per cow or $.02 per lb. of butterfat produced. This means that receipts were enough to pay all charges as we have itemized them, including the operator's labor, market price for all feed he furnished and a going rate of return for his capital, and leave him a margin of $6 per cow.

If we are interested in finding the return to the operator for his and his family labor from the milking enterprise, then we could add all expenses as we have listed them, except operator and family labor and subtract this total from receipts. This gives $93 per cow or $.27 per lb. for butterfat produced. This means family labor earned $1.16 per hour.

If we assumed that the operator owned all the capital debt free and wished to find the return for family labor and capital, we would not allow a charge for these items as expense. The return was $128 per cow or $.37 per lb. of butterfat.

On the cost side, feed accounted for 46% of total cost; labor, 21%; interest on investment, 8%; hauling charges, 6%, and depreciation and repair of buildings and equipment, 5%. These five items accounted for 86% of total cost.

The detailed listing of all receipts and expenses is given in the table. These are for an average of 24.5 cows per herd producing 345 lbs. fat per cow.

Manufacturing Milk Less Profitable

The foregoing discussion pertains to production of grade A milk. We found the production of manufacturing milk less profitable. In general, herds were smaller, receipts for milk were less per lb. of butterfat and production was only 324 lb. per cow. The distribution of cost items was much the same. Labor per

RECEIPTS, EXPENSES AND NET RETURN FOR GRADE A MILK ENTERPRISES, CACHE AND SANPETE COUNTIES, UTAH, 1956

Item	Average			Percent each is of total
	Per farm	Per cow	Per lb. butterfat	
	dollar	dollar	dollar	percent
Receipts:				
Milk sold	9,577	391	1.13	88
Milk used on farm	508	21	.06	5
Credits for calf and manure	784	32	.09	7
Increased cow inventory	...	...	....	...
Total receipts*	10,869	444	1.28	100
Expenses:				
Hauling charges	687	28	.08	6
Hired labor	149	6	.02	2
Breeding costs	149	6	.02	2
Fees, taxes and insurance	360	15	.04	3
Vet. and medicine	137	6	.02	2
Fuel and power costs	405	16	.05	4
Feed purchased	1,263	52	.15	12
Feed raised†	3,670	150	.43	33
Operator and family labor	2,124	87	.25	19
Interest on investment	851	35	.10	8
Dep. and rep., bldg. and equipment	491	20	.06	5
Decreased cow inventory	250	10	.03	2
Other	187	7	.02	2
Total expense	10,724	438	1.26	100
Return measures:				
Net returns above all costs	145	6	.02	...
Ret. above all costs except operator and family labor	2,269	93	.27	...
Ret. to labor per hour	1.16	...	....	...
Ret. above all costs except operator and family labor and int. on investment	3,120	128	.37	...

* Patronage dividends or refunds have not been included in total receipts. The exact amount was not known at the time of the study but when known should be considered as additional receipts. About one-half of the enterprises included in this study would be affected by this consideration.

† We charged home-grown feed at the price it would sell for at the farm. For pasturing and field gleaning we arrived at an alfalfa hay replacement amount and applied the appropriate price for standing hay in the field. This averaged about $13 per ton.

cow was higher primarily because of differences in size of herd while investment per cow was much smaller. The return for the labor of the operator and his family was $.19 per hour or $20.17 per cow.

A Successful Enterprise

While it was not the purpose of this study to recommend dairy practices or production methods, we did hope to discover what activities were associated with a successful enterprise. Here are our observations:

It is possible to spend too much time and effort in an attempt to get high production per cow. This was not the case, however, in this study. We found that high levels of butterfat production are essential to success. It took about 330 lbs. of butterfat per cow to break even. Fifty-five herds averaging 264 lbs. of butterfat per cow lost $67 per cow. Thirty-nine herds averaging 435 lbs. of butterfat per cow made a net return of $59 per cow.

Some producers spent more time with the milking enterprise than can be economically justified. In our study the fewer hours of labor spent per cow, the higher the net returns. It is possible to neglect the milking herd by eliminating needed attention. But efficient work methods and adequate size of herd make it possible to use labor efficiently. Where labor costs are high, labor can be used more efficiently by increasing the size of herd. Regardless of size of herd, labor costs can be reduced in most cases by using the most efficient work methods so that all duplications of routes, motions and operations are eliminated.

Feed was the largest single cost item. Here we found a great deal of variation. Where feed was adequate, but economically fed, there was a satisfactory net return. A group of 31 herds with an average feed cost of $.39 per lb. of butterfat produced 377 lbs. of butterfat per cow at a profit of $55 per cow. A group of 62 herds with an average feed cost of $.77 per lb. of butterfat produced 292 lbs. of butterfat at a loss of $82 per cow. The amount of grain fed per lb. of butterfat produced affected profits. In this study, we found no close relation between a high level of grain feeding and a high level of butterfat production per cow.

An old fella wanted to be a centenarian but was told by his doctor to give up drinking and smoking. "Will I live to be 100?" asked the patient.
"No," said the doctor, "but it will seem like it."

This study seems to indicate that costs of feed per lb. of butterfat might be reduced by:

- Improving the butterfat production potential of each cow.
- Watching the amount and quality of feed fed.
- Improving the balance of the feed fed.
- Eliminating opportunities for the cow to waste feed.

In our study the average herd just about broke even financially. Performance better than average adds to success.

We attempted to find the activities and their level of performance that paid best. We divided all the records in three groups based on net returns per cow. The most profitable third of the herds had 27.5 cows producing 372 lbs. of butterfat at a net return of $91 per cow. They had low investments per cow, low labor cost per cow, low feed cost per cow, consequently, low total cost per cow.

Time Marches On

A similar study in a similar area was conducted in 1938. Economists found the average number of cows per herd was 10.1. These cows produced 253 lbs. of butterfat per cow. An average of 160 hours of man labor per cow was invested in the milking herd.

Our study in 1956 shows herds of that size and, with those hours of man labor, lost $116 per cow even though butterfat production was 338 lbs. per cow. Time marches on. The average size dairy herd, production and practices of 19 years ago are not profitable today.

Hog Outlook for Fall

Fall hog prices will stay high enough to make the farmer a profit providing consumer buying doesn't drop any more than is currently predicted, thinks John Ferris, farm economist at Michigan State Universities.

Prices will be down a little from last fall's level due to a little larger pig crop. But Ferris believes that the drop will be only slight because the increase in the pig crop is modest considering the high hog-corn ratio of last year.

Total December-to-May pig crop is expected to be around 6 per cent larger than a year ago. Most of this increase was farrowed in the December-to-February period. In the more important March-to-May period only 1 per cent more sows were expected to farrow.

The farm economist expects the peak in slaughter this fall a little earlier than usual. The peak has been in December. But in 1956, it was in November and last year it was in October.

About 13 per cent more sows and gilts are expected to farrow this summer. There's no immediate threat to the slaughter market price level. But Ferris warns that if this increase continues into the fall and spring farrowing seasons over-production problems can probably be expected in 1957.

If farmers would restrain themselves as they did this year, the economist concludes, hogs could make money for them next year, especially if corn prices hold to levels of this last year.

IN WISCONSIN

Count on Seed from the Northern Corn Belt

Vigorous growth potential of Renk seed germ is shown by this cross-section photo.

Now is the Time to Set Your Sights for a Bin-Buster!

If you're looking for a corn crop big enough to call a bin-buster, now is the time to set your goal . . . and here's the way to start: Look up a RENK seed corn dealer . . . talk over these proved guideposts on the right seed for big yields in your area.

KNOW What's Back of Your Seed, be sure it's grown for your area.

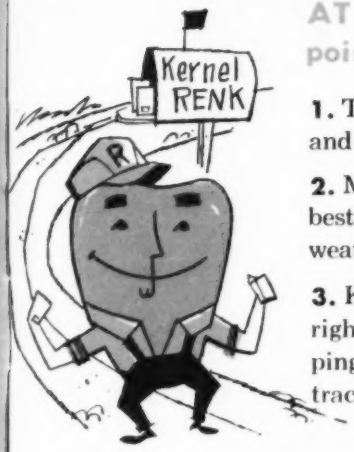
1. Bred to mature early, Renk corn is ripe by picking time. This is the seed that can help you forget soft corn worries.

2. Produced where it is sold and tested where it is planted, this corn has been developed to withstand cold soil and late springs of the northern corn belt. Renk corn is selected for early germination, growth-tested and proved sure under typical Wisconsin and Minnesota spring planting conditions.

3. Straight strong stalks carrying big ears with deep kernels for heavy yields on the soils of Wisconsin and Minnesota . . . that's what year-after-year research has done for you . . . why you can be sure Renk varieties outperform ordinary hybrids in each maturity zone.

4. Chosen for its ability to stand off insects, drouth, and disease threats, each Renk variety has proved its value by passing rigid performance tests before release to Renk customers.

Kernel RENK says, "You'll worry less about



AT PLANTING TIME, use these pointers to help boost yields:

1. Test your soil, then apply the needed fertilizer and lime.

2. Make a good seedbed on good land . . . use the best seed you can buy . . . and try to hit the right weather.

3. Know the grading of your seed . . . and use the right plates for accurate drilling or hill-dropping . . . at the right depth . . . and at the right tractor speed.

ROW SPACING	DISTANCE BETWEEN KERNELS	POPULATION PER ACRE
42-inch Rows	13⅓ Inches	11,120
40-inch Rows	13⅓ Inches	11,676
40-inch Rows	10 Inches	15,700
38-inch Rows	10 Inches	16,525
42-inch Rows	8 Inches	18,685
40-inch Rows	8 Inches	19,600
38-inch Rows	8 Inches	20,631
40-inch Rows	6 Inches	26,180

out *soft corn . . . when you plant RENK hybrids"*

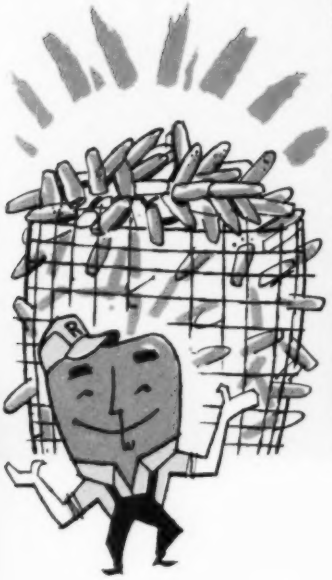
DURING SUMMER MONTHS, note the progress of your crop

1. Watch how Renk varieties resist insects and disease. Years of research on Renk corn, constant culling of weak strains, and careful selection of only the hardy, resistant varieties.

2. Good pollinating ability gives Renk varieties a marked advantage over ordinary hybrids — another reason your yields are safer.

3. Strong stalks that stand up well for easy picking assure you more corn cribbed—you'll like the stalk strength and size of Renk corn.

Kernel RENK says, "Milk and Meat can't



STEP AHEAD IN MILK, MEAT & MONEY

Plan for a Renk Bin-Buster now

1. 100 bushels and better in each maturity zone . . . that's what you expect and get from Renk.

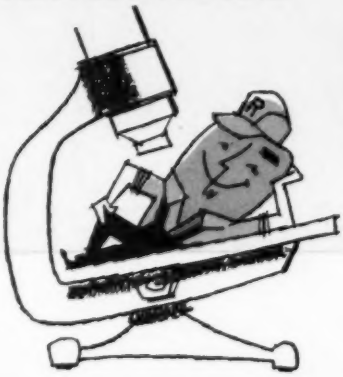
2. Silage enough from one acre to more than equal the grain yield value from two acres. Renk Silo Korn has a special value in feeding cows for maximum milk output.

Breeding of parent stock is vital part of Renk research.

Seedlings on right have been selected for fast germination at 50° temperature.

Kernel RENK says, "Your best deal is with a RENK

The Quality You Want Comes From RENK RESEARCH



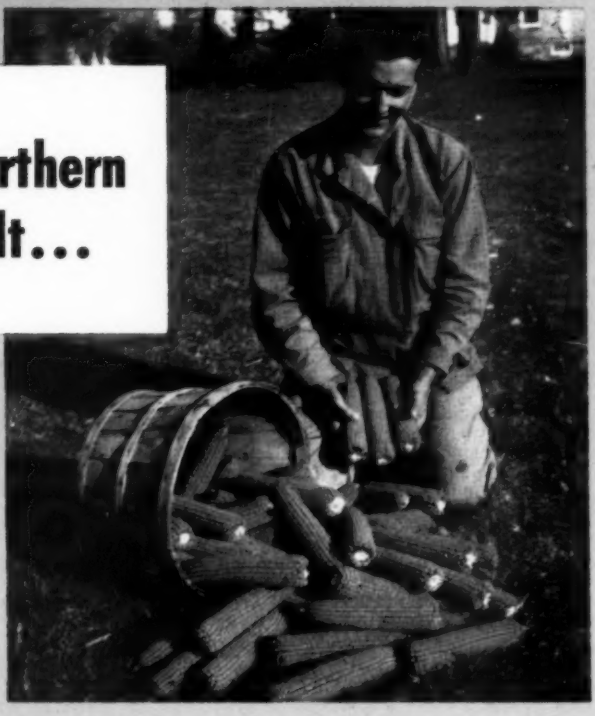
Root development must be good before Renk approves a variety for release.

1. Searching and testing of many corns has resulted in the selection of corn with the vigor to germinate and grow fast—even in cool soil.
2. Vigorous Renk seedlings send down roots fast because research has selected varieties that grow fast enough to mature in the northern corn belt climate.
3. Stalks that stand up come from Renk research. Renk varieties have been developed to withstand wind storms several ways:
   a. Deep expansive root systems anchor stalks against wind.
   b. Resist corn borer damage because stalks are exceptionally strong.
   c. Bred to resist stalk rot damage.
4. High yields of Renk corn is your assurance that Renk research has saved and developed only the best from many varieties tested.

Standability at maturity is an important factor in Renk research.

dealer . . . see pages 14-15."

In the Northern Corn Belt...



get Super Yields with

RENK'S

GOLDEN GROWTH SEED

Turn flap for your choice of variety ▶

EARLY ZONE

MEDIUM ZONE

LATE ZONE

EARLY ZONE

R22 Maturity 80 days

A very early hybrid for northern areas and cool season belts. Has been grown on thousands of acres in this area, making good yields and good-quality corn. Ears are medium length and thickness; kernels are semi-flinty. Stalks are somewhat slender and practically free from suckers. A real champion for areas with short growing seasons.

R33 Maturity 85 days

A new early maturity corn with excellent field appearance. R33 is an exceptional yielder for an early corn. The husks pop open when ripe for clean, easy husking. The kernels are golden yellow, with a high shelling percentage.

R77A Maturity 93 days

You'll like the early maturity and high yield of this tested and proven yellow dent hybrid. It is an exceptional performer for silage and grain. R77A is an excellent standing corn. The yield of this easy-husking corn is better than average.

R79 Maturity 90 days

A sensational new red dent-yellow dent cross. An exceptional performer for both grain and silage. Ears are reddish-yellow in color; stalks are unusually large and leafy for an early corn. Equals any other 90-day hybrid for grain yields and leads them all for silage production.

R88A Maturity 95 days

A very popular hybrid over a wide range of short-season areas. Has big, showy ears on long shanks — makes a striking field appearance for an early corn. Has excellent standability and resistance to diseases that cause stalk breaking. Leaves are deep green, tall and leafy, making a fine silage corn.

R101 Maturity 100 days

Here's an outstanding new early hybrid that yields like a later corn. Matures large, slender ears filled with golden nuggets of corn. R101 has a good shank, husks easily, and the strong stalk stands up well. This is one of the truly great early hybrids of fast maturity.

R123 Maturity 100 days

Here's a great hybrid! R123 is another flashy red dent-yellow dent cross with outstanding ear size, shape and proportion. One of the highest yielders ever released in this maturity class. Has excellent stalk qualities and makes a good silage corn. Picks clean, with little ear droppage.

RENK REPLACEMENT AGREEMENT

If your Renk corn must be replanted for any reason, Renk will furnish replacement seed free of charge.

MEDIUM ZONE

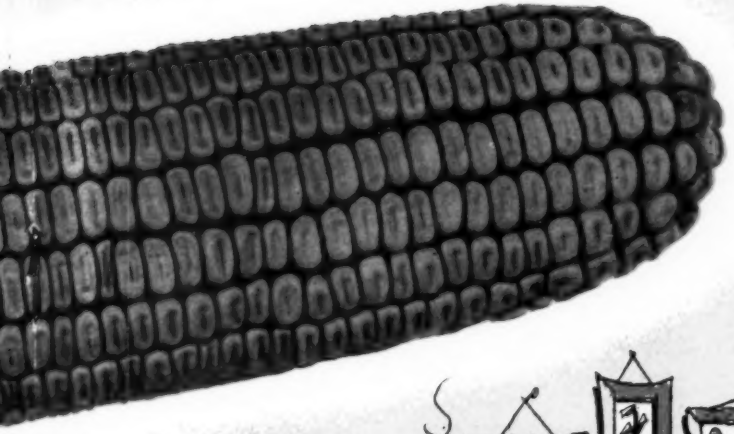
R221 Maturity 105 days

We continually try to improve on the best. Here's a new series that looks exceptionally good. It has good ear length, ease of husking and exceptional yield. It holds its ear well and will stand a lot of weather. The golden kernels on big ears — mixed with a leafy stalk — will make succulent silage. Here's a type of corn that feeders like.

R222A Maturity 105-107 days

A rugged, high-yielding variety with exceptional resistance to lodging, insects and disease. Has wide range of soil adaptation and good cold tolerance in the spring. Golden-colored ears are the "baseball bat" kind you like to see in your field. An excellent hybrid for either machine or hand picking.

Kernel RENK says, "A new RENK variety must be at least 10% better than the old one before it can be released for sa



R202AA Maturity 107 days

An improved R202A that illustrates scientific corn breeding at its best. A tremendous yielder with very long, deep-kerneled ears filled out to the ends of the cob. Makes a very showy field of corn that is as good as it looks. Stalks are about 8 feet tall with deep green foliage. Strong root system; stands well. Ears are on medium-long shank and are at a uniform height of 3 to 4 feet. Does not drop ears. Very good for machine picking.

R202 Maturity 110 days

A full-season variety over most of the northern corn belt. Has the fine ear and stalk characteristics of R202AA, but slightly later maturity gives it added yielding ability. Deep, broad root system helps resist hot, dry weather. Preferred by many for silage as well as grain.

R244 Maturity 108-110 days

A very showy new corn with long, well filled ears. Stalks are stiff and stand well, grow to medium height and are well eared. One of the best yielders in its class, yet husks exceptionally clean. This corn rates as the CRIB BUSTER of the medium zone.

LATE ZONE

R405A Maturity 115 days

Again R405A is the outstanding choice of farmers who need a medium-late variety. This sensational demand is due to the fact that it yields like a late corn and has exceptional field appearance early in the fall. Long, slender golden ears and dark green foliage make it one of the showiest of all Renk Hybrids. Ripens and dries very quickly after maturity starts in the fall. Winner of the grand prize in 1952 contest.

R500A Maturity 115 days

R500A made the world record yield in 1954! This variety is particularly suited to dark fertile soils, but has remarkable adaptation to many soils and seasons. A heavy yielder that matures extra early. Husks loosen up in the fall for quick drying, making it one of the first corns ready for harvest in its maturity zone. Ears hang down on medium-long shanks. Disease-resistant stalks tolerate corn borer. There is no corn anywhere that will out-yield R500A in a good season. Winner of the grand prize in 1953 and 1954 contests.

R488A Maturity 120 days

You will find this sensational, new 120-day corn out-yields any of them. The long, heavy ears are carried on good shanks and a powerful well-braced stalk. It picks clean and is excellent for grain or silage. For big yields in the 120-day corn areas, get this new R488A — a very attractive corn in the field. R488A shows consistent performance over a wide range of soil and climate conditions. A standout hybrid in its maturity area.

RENK SILO CORN
Three Maturities... Early, Medium, Late

This corn makes a forest of broad, green leaves on a healthy stalk, and carries a good ear of corn. Renks developed SILO KORN the same way they developed high-yielding grain varieties to give maximum tonnage per acre. It is not a blend, but a corn bred for the silo — giving you silage at its best. Available in flats and rounds.

HERE'S NEWS YOU'LL LIKE

Worth-while SAVINGS... on Renk's Package Deal

Make important savings on your seed costs. Get *ALL* your seed from your Renk Dealer.

This is How You Save

Buy one of the Renk "Package Deals" and get a discount because you are buying seed in volume. We save handling and shipping charges and pass the savings on to you.

3 bushels of Renk seed corn
30 bushels oats or barley
3 bushels any grass or legume seed

GREEN TICKET DEAL
Discount 3%

6 bushels Renk seed corn
60 bushels oats or barley
6 bushels any grass or legume seed

YELLOW TICKET DEAL
Discount 4%

12 bushels Renk seed corn
120 bushels oats or barley
12 bushels grass or legume seed

Kernel RENK says, "Tractor-plant at a speed of 3½ mph for best stands."

CONVENIENT PAYMENTS

to fit your income

On Renk's Easy Pay Plan

On any Renk seed you buy, pay just ten percent down when your order is delivered. Then pay the balance as it fits your income from milk, livestock, or crop sales. Your Renk dealer has full particulars on this convenient purchase plan. Remember, good seed is good crop insurance . . . and this Easy Pay Plan assures you of good seed even though you may be short of cash at the time you buy your seed.

I'm sold on Renk corn because I have proved for myself what it has done on my farm — 225.9 bushels per acre!

GEORGE TYSON, JR.
Watertown, Wisconsin

top row, left—
Wilbur N. Renk,
Vice President, Wm. F. Renk & Sons
right—
Walter F. Renk,
President, Wm. F. Renk & Sons
seated, left—
George Tyson, Jr.
right—
George Tyson, Sr.

Kernel RENK says, "More corn is hurt than helped by cultivating after June 20."

Order your Small Grain, Grass and Legume Seed from your RENK DEALER

Triple-Graded Oats

AJAX — A Canadian oat popular in the Midwest. Wisconsin-Certified.

BEEDEE—A promising new Wisconsin oat with disease resistance. Wisconsin-Certified.

BURNETT—An early mid-season variety of medium height, with medium stiff straw. Kernels are yellowish-white. Wisconsin-Certified.

CLINTLAND—An early oat with high test weight. Wisconsin-Certified.

FAYETTE — A new early Wisconsin variety showing promise. Wisconsin-Certified.

GARRY—A late Canadian oat that yielded exceptionally well in 1956. Wisconsin-certified.

MINHAFER—Large kernels with high test weight and stiff straw. It is a yellow variety and matures early. Wisconsin-Certified.

NEMAHA — Early, good-yielding oat with medium-height straw. Not certified.

NEWTON—Developed in Indiana as a medium maturity oat with tremendous yields. Not certified.

SAUK—One of the best oats for Wisconsin. Wisconsin-Certified.

Best in Barley and Spring Wheat

FOX — A new Wisconsin barley showing good yields and standability. Wisconsin-Certified.

KINDRED or "L" — Early-maturity variety, resistant to stem rust. Wisconsin-certified.

MONTCALM — An excellent malting barley. Medium tall, medium maturity and has moderate straw strength. Wisconsin-Certified.

TRAILL—A new North Dakota barley. High yielding with shorter, stiff straw. Slightly later than Kindred. Wisconsin-certified.

HENRY—Bearded, red spring wheat that yields well. Wisconsin-Certified.

SELKIRK—A new awnless hard spring wheat. Matures earlier than Henry. Wisconsin-Certified.

RUSSELL — A new feed wheat with good disease tolerance. Wisconsin-Certified.

Renk Grass and Legume Seed

ALFALFA — Certified Vernal and Ranger—other common varieties

CLOVER—All varieties.

GRASS—Brome, timothy, others.

Tailor Your Seeding to the Job It Must Do

Your best seeding results at the lowest cost will come from using the right seed for the purpose you have in mind. Here are a few tips from Renk on mixtures you might want to use for specific purposes.

LONG ROTATION on fertile soil; pounds of seed per acre

No. 1 Alfalfa, 6-12 lbs.; smooth brome, 3-10 lbs.

No. 2 Alfalfa, 8-10 lbs.; Ladino, ½-1 lb.; smooth brome, 3-12 lbs.

No. 3 Alfalfa, 6-10 lbs.; medium-red, 1-3 lbs.; smooth brome, 4-12 lbs.

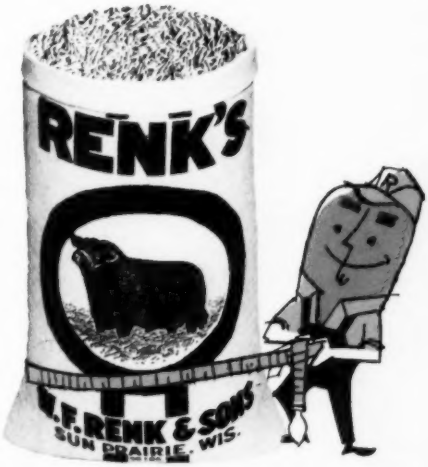
SHORT ROTATION on good soil

No. 4 Medium-red, 6-8 lbs.; timothy, 8-10 lbs.

No. 5 Medium-red, 4-6 lbs.; alsike, 2 lbs.; timothy, 4-6 lbs.; and/or smooth brome, 6 lbs.

SHORT ROTATION for green manure

No. 6 Biennial sweet clover, 6-15 lbs.; smooth brome, 10-12 lbs. or timothy, 3-6 lbs.



Your RENK DEALER is as near

WISCONSIN

ALLENTON — Schwartz, Walter, Route 1
AMHERST — Swenson, Charles
ARCADIA — Keikhoefer, Richard, Route 2
ARLINGTON — Wagner, E. J.
AUBURNDALE — Hoffman, Tony
BALDWIN — Beam, Charles
BARABOO — Jantz, Harry, Route 1
BARRON — Maack, Otto, Route 2
BEAVER DAM — Maurer, Herman, 319 York St.; Schoenfeld, John, Route 1
BELLEVILLE — Klassy, S. B.
BLANCHARDVILLE — Million, Wm.; Carpenter, Harold
BLOOMER — Lane, Otis, Route 1
BLOOMINGTON — Schmidt, Martin
BLUE MOUNDS — Steiner, Albert
BLUE RIVER — Hanson, Vestor, Route 2
BONDUEL — Stuewer, Harry, Box 402
BOWLER — Thiex, Derven, Route 1
BRANDON — Gysbers, Wilbert
BRUSSELS — Baudhuin, Raymond
BURLINGTON — Rossmiller, Harold, Route 2; McCarthy, James, Route 5; Ahler, Bernard, Route 5
BURNETT — Possin, Orris, Route 1
CAMBRIA — Manthey, Wm. H.
CAMBRIDGE — Zastrow, Paul, Route 1
CASHTON — Jantz, Wm., Jr., Route 1
CAZENOVIA — Marshall, Harry, Route 3
CHETEK — Krans, Thomas, Route 1
CLAYTON — Anderson, Carl, Route 1
CLINTON — Nelson, Harry
CLINTONVILLE — Tellock, Glen, Route 1
COBB — Shields, Mrs. Richard
COLFAX — Topper, Ernest, Route 3
COLUMBUS — Benisch, Oliver, Route 1; Liebenthal, Loren C., Route 2; Slade, Clyde, Route 2; Skalitzky, Joe, Route 3
COCHRANE — Schwanke, Vilas
COTTAGE GROVE — Holten, Henry, Route 1
CROSS PLAINS — Statz, Albert
CUBA CITY — Gubbels, John; Kunkel, Killian, Route 1
CUSTER — Groholski, Ed., Route 1
DALTON — Breneman, Glen
DARIEN — Folts, Karl V.
DARLINGTON — Barnes, Vivian, Route 4; Stauffacher, John M., Route 2
DEERFIELD — Gangstad, Morris, Route 2; Fox, Pearl E., Route 1
DE PERE — Cashman, Edward, Route 2
DODGEVILLE — Lee, Mrs. Archie, Route 4
DOWNING — Kostman, Earl
EDEN — Hayes, John, Route 1
EDGAR — Stencil, Wallace
ELKHORN — Potter, Warren, Route 3
ENDEAVOR — Wade, Paul S.; Johnston, John
EVANSVILLE — Evansville Feed & Fuel; Larsen, Jacob
FERRYVILLE — Austin, Sidney
FORT ATKINSON — Telfer, Harlow, Route 2
GRATIOT — Paulson, James
GREEN BAY — Van Den Plas, Henry, Route 2
GREEN LAKE — Wuske, Wm., Route 1; Schwarz, Eugene, Route 1
GRESHAM — Brady, Melvin E.
HALES CORNERS — Dufenhorst, George, 6115 South 108th St.
HAMMOND — Hansen, Charles
HANCOCK — Wedell, Martin G., Route 1
HARTFORD — O'Neill, J. J., Route 1; Rettler, George, 547 Center Street
HAZEL GREEN — Roling, Ben F.
HORICON — Puls, August, Jr., Route 1
HORTONVILLE — Hansen, Norman, Route 2
IRON RIDGE — Key, Kenneth, Route 1
JANESVILLE — Clark, Robert, Route 1; Demerow, Kenneth, Route 2
JEFFERSON — Schopen, Julius
JOHNSON CREEK — Huebner, Harry, Route 1
JUDA — Preston, Robert
KEWAUNEE — Struck, Carl, Route 1
LANCASTER — Case, Lloyd; Koehner, Hugo; Laugeson, Viggo, 718 S. Harrison St.; Steiger, Cornelius T.
LENA — Massen, Wilfred, Route 4
LODI — Koltes, Joe; Kippley, Joe
LOGANVILLE — Schuch, Erwin, Route 2
LOYAL — Schuette, Arthur
MALONE — Schussman, H. W.
MANITOWOC — Bernhardt, Fred, Route 4
MARKESAN — Walther, Hilbert
MARSHALL — Tennant, James
MAZOMANIE — Schlough, Roy
MERRILL — Storm, Edgar, Route 1
MIDDLETON — Hagen, Iver, 2028 Parmenter St.
MINDORO — Cain, Vernon
MINERAL POINT — Ferrell, Stanley
MONROE — Carter & Gruenwald, Highway 11, W.
MONTICELLO — Buehl, Wm., Sr.
MOSINEE — Zebro, Frank
MT. HOREB — Post, Francis; Ruef, Arthur C.
MUSCODA — Zahalka, Louis
NEENAH — Hooyman, Aloysius, Route 2
NEW LONDON — Volz, Alfred, Route 2
NEW RICHMOND — Huser, Frank E.
NORTH PRAIRIE — Lewry, Galen G.
OCONTO FALLS — Delzer, Wm., Route 2; Dwerniczak, Wm., Route 2
OREGON — Robinson, Clyde, Route 1
ORFORDVILLE — Damerow, Wayne
OSHKOSH — Lee, Milton, Route 4
OXFORD — Smith, David
PALMYRA — Murn Implement Co.
PEWAUKEE — Abel, Otto Paul, Route 1; Steele, Allan
PINE RIVER — Sorenson, George
PLAIN — Brey, Art
PLAINFIELD — Gear, Carroll & Son
PLATTEVILLE — Austin, Hubert, 712 N. Court St.
PLUM CITY — Black, Wilbur
PORTAGE — Ziehmke, Lester
POUND — Equity Co-op
POYNETTE — Stewart, Gordon; Johnson, Ingolf
PRAIRIE DU SAC — Meier, Lawrence
PRESCOTT — Hildebrandt, John
PRINCETON — Washkovick, Ed
RANDOLPH — Christian, Donald, Route 2
REEDSBURG — Beth, Carl, Route 2; Lawrence, Claude
REESEVILLE — Hahn, Emil, Route 1
REWEY — Geninen, Alvin, Route 1
RICHLAND CENTER — Barnes, Leron, Route 1
RIO — Johnston, Otto; Risgaard, Soren; Loper, Marvin
RIPON — Sauer, Herman, 328 Vermont St.; Starr, Donald, Route 3
ROSENDALE — Vollbrecht, H. A., Route 1
SEYMOUR — Jenkins, Charles
SHARON — Daniels, R. O., 123 E. School St.
SHEBOYGAN — Nytes, Al, 819 Lincoln Ave.
SHULLSBURG — Black, Walter
SPARTA — Clemmerson, David
STETSONVILLE — Meschefske, John
STEVENS POINT — Lesavage, Frank, Route 3
STUEBEN — Duha, John & Sons
STURTEVANT — Weber, Joseph; Smith, Allen F., Route 1

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SUN PRAIRIE — Weisensel, F. X., 247 Bristol St
SURING — Suring, Henry, Route 1
TISCH MILLS — Pivonka, Mike
VERONA — Legler, Fred
VIOLA — Harris, Gerald
WATERLOO — Haberman, Roy, Route 2;
Holzhuster, Wm.;
Uglow, Raymond A., Route 2;
Yelk, Harvey, Route 1
WATERTOWN — Richter, Ray;
Lange, Walter, Route 1
Schadt, Clarence, Route 6;
Sell, E. R., Route 3;
Tyson, George, Route 6;
Welles, Art, Route 2;
Wiedenhoeft, Wm., Route 3;
WAUSAU — Mueller, Walter; Rick, Willard
WEST BEND — Gruhle, Wm. H., Route 2;
West Bend Consumers Co-op
WESTFIELD — Polivka, Louis
WEST SALEM — Cox, Frank T., Route 1
WHITEWATER — Godfrey, Robert
WILDROSE — Hadden, Gilbert
WILTON — Schindler, Reuben
WISCONSIN DELLS — Langer, Lee
WONEWOC — Smith, Lester

MINNESOTA

APPLETON — Beal, Fred; Blom, George
BARRETT — Getz, Roy
BELGRADE — Berg, Arthur E.
BENSON — Lee, A. M.
BIRD ISLAND — Halder, Frank J.
BUTTERFIELD — Evers, Fred & Son
CHANDLER — Tweet, Henry
CLARKFIELD — West, Mrs. Emil
COLOGNE — Erhard, O. J.
COTTONWOOD — Paradis, Walter
CURRIE — Hansen, P. N.
DANUBE — Johnson, Kermit
DONNELLY — Wegter, Charles
EAGLE BEND — Lage, John
ELBOW LAKE — Westrom, Selmer & Son
ELGIN — Phipps, Ray & Son
FERGUS FALLS — Danielson, L. Vernon, Route 3
FOXHOME — Lankow, Jesse
FRANKLIN — Dickmeyer, Theo.
GIBBON — Kent, Sigfried
GLENCOE — Griesman, John
GRANADA — Carlson, Maynard
HARTLAND — Borge, Sigurd
HAYFIELD — Mogen, Clarence
HENDERSON — Spenc, Joseph
HERON LAKE — Kubichek, Louis; Walter, Doyle
HOLLOWAY — Zinda, Richard
IONA — Stoderl Brothers
JASPER — Nelson, Verlyn, Route 2
KENSINGTON — Oney, L. Johnsen
KENYON — Cordes, Herbert
LAKEFIELD — Brumm, Paul; Swanson, Carl A.
LeROY — Jensen, Francis
LITCHFIELD — Johnson, Francis, Route 3
LITTLE FALLS — Peterson, Raymond,
413 Seventh Ave., N. E.
LONG PRAIRIE — Knapp, Wm.
MABEL — Decon, Donald; Fawcett, Irwin
MADELIA — Bowers, Harold, Route 3;
Hagen, Alfons, Route 1
MANKATO — Bronner, J. J.
MILACA — Ruis, John
MILROY — Gilb, Alvin
MONTEVIDEO — Bispoard, Ivan; Dagel, Thomas
MORRIS — Meyer, Norman
MOUNTAIN LAKE — Bochman, Leland
NEW LONDON — Hovey, George;
Bengtson, Beuford
NEW PRAGUE — Polansky, Joe
NEW RICHLAND — Bryneldson, Godfrey
NEW YORK MILLS — Larsen, A. W.
NORTHFIELD — Stanke, Roger, Route 2
PIPESTONE — Hinz, Louis;
Olson, Harold, Route 1; Olson, Ellwood
PORTER — Maertens, Earl
RAYMOND — Onnen, C. W., Route 1
REGAL — Neubaurer, Norbert
RENVILLE — Dahl, Oliver
RICHVILLE — Mielke, Clarence
SABIN — Krabbenhoft, E. F.
SANBORN — Hoehne, Orva
SEDAN — Klitzke, John
SHERBURN — Swanson, John P.
SILVER LAKE — Bandas, Frank A.
SLAYTON — Van Dyke, Stanley
SLEEPY EYE — Marti, Elden
SPICER — Jacobson, Engvald
SPRING VALLEY —Terbeest, Russell
ST. CLOUD — Athmann, Rudy
ST. MARTIN — Nordmann, Cyril
STANCHFIELD — Nelson, George E.
STEEN — Bosch, John
STEWARTVILLE — Henke, Richard
STORDEN — Peterson, Clair
SUNBURG — Nelson, Manford
TRUMAN — Clow, Roy B.
WADENA — Gedde, Clifford A.
WINDOM — Wojahn, Julius
WOODSTOCK — Zemke, Herman
WORTHINGTON — Johnson, Ray

ILLINOIS

CHERRY VALLEY — Hawkey, Lewis
DAVIS — Pieper, Belford
ELGIN — Donahue Bros., 413 Mill St.
ELIZABETH — Berlage, Gus
MILLEDGEVILLE — Smith, Paul;
Bowers, Rolland E.
MORRISON — Drolema, Richard
POPLAR GROVE — Anderson, Louis
ROCHELLE — Gulo, A. E.
STOCKTON — Arrand, George, Route 3
WINNEBAGO — Alex, Clarence

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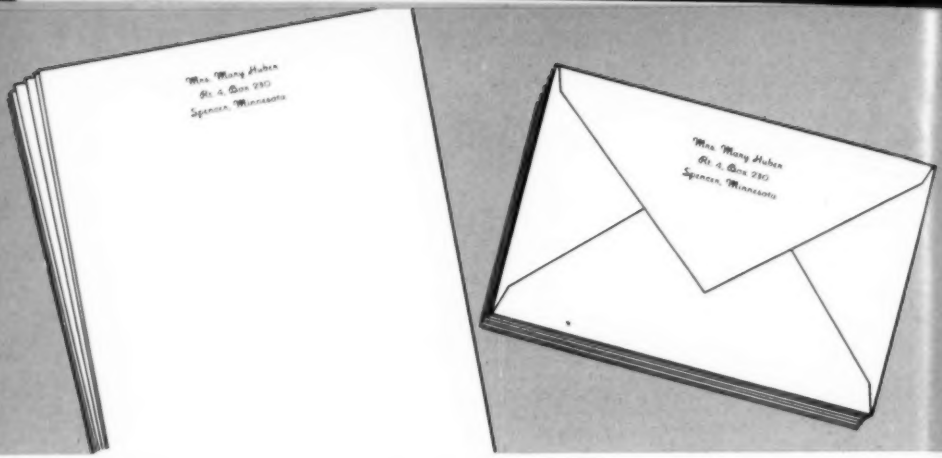
CRESCO — Huinker, Ed., Route 4
DUBUQUE — Donovan, John, 977 Cleveland Ave.
GUTTENBURG — Blossfield, William
LE MARS — Laughton, Floyd
LITTLE ROCK — Groen, John
LOW MOOR — Young, Clarence
NEW ALBIN — Hartley, Grant
OXFORD JUNCTION — Benhart, Richard
WATERVILLE — Peterson, Selmer
WAUKON — Kerndt, Clarence
VOLGA — Beiderman, John

NORTH DAKOTA

HORACE — Trottier, Alderic

SOUTH DAKOTA

ALEXANDRIA — Pitts, Francis
BIG STONE CITY — Saeger, George
CANOVA — McDaniel, R. W.
COLTON — Schaefer Brothers
FULTON — Pitts, Everett
MILBANK — Vissers, George J.
SPENCER — Schuttler, Charles
WAGNER — Soukup, Ben J.
TWIN BROOKS — Lage, Wilbur



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PELLETS
Important New Look in Roughages

Pelleting is a whole new concept of livestock feeding and it's headed your way . . .

Condensed from Successful Farming
Mike Boy and *Vernon Schneider*

LATE news about pelleting marks one of the most significant revolutions in livestock feeding. The idea has snowballed. Today, pelleting is one of the hottest topics in engineering and nutritional circles.

Why, suddenly, has so much attention been focused on the pelleting of feedstuffs? Here's how H. D. Bruhn, a pellet researcher, explains this phenomenal development: "This individual kernel of corn or grain is nature's version of the pellet. However, today's rations demand a combination of roughages, grains, and supplements. As a result, we have found it necessary to grind, mix, and then reconstitute these ingredients into a man-made pellet."

There are two major fields of interest in pelleting — the engineering aspect and the nutritional. Let's look closely at both.

From an engineering aspect, there is activity on two fronts: To bring down the present cost of pelleting and to develop a field pelleting machine which will make large pellets without grinding the forage.

Here's a closer look at what pelleting is costing farmers and ranchers today:

- Commercial pelleting of preground, premixed feeds—$2 to $3 per ton.
- Farm pelleting of preground, premixed feeds—$4 to $5 per ton.
- Grinding, mixing, and pelleting complete ration—$6 to $10 per ton.
- Grinding, pelleting all-roughage ration such as long hay—$9 to $15 per ton.

The above prices are based on present-day pelleting machinery which, in most cases, is designed for the milling and feed industry. Future pelleting machines—and pelleting systems—must be de-

Reprinted by permission from Successful Farming, Des Moines 3, Iowa

signed specifically for farm use.

The present high cost of pelleting roughage points the way to the development of a lower-cost method of making pellets. Many researchers feel that a field-pelleting machine making a different type of pellet is the answer. Major machinery manufacturers share this view and are presently working on field-pelleting machines. Some experimental models will be in use this year.

The mantis is the only known insect that can turn its head and look over its shoulder like a human, wash it's face like a cat, take food from your hand like a dog, and bend over and drink water like a horse.

"How soon will you be able to buy a field-pelleting machine at your local dealer? Probably in the next 4 or 5 years," says Professor Bruhn.

"The processing of partially field-cured hay into large pellets —2" to 5"—to be finally cured by artificial means offers considerable promise. This type of field pelleting will require about double the power of baling. Thus such a machine is entirely within the realm of possibility."

Now let's take a look at the advantages — and disadvantages —of pelleting.

Advantages

- Reduced bulk. Pelleting can reduce bulk by about 80 per cent over loose or chopped hay—50 per cent that of baled hay.
- Easier handling. For the first time, it will be possible to entirely mechanize the handling of roughages.
- Reduced waste. Wind loss on the range can be substantially reduced. "Billing" by poultry can be avoided. When feeding roughages, *all* the plant is eaten by the animal.
- Complete control of ration. Selective eating is eliminated—each pellet can be made a balanced ration.
- Feed intake increased. As we climb to higher and higher production levels, consumption is an increasing limiting factor. Simply stated, pellets enable the animal to eat more. This is especially true if the ration contains low-quality roughages.
- Dust control. Certain powdery ingredients, like alfalfa meal, can be handled with less dust in pellet form.

Disadvantages

- Cost of pelleting. As we have indicated, pelleting the feed is an added cost. Advantages must more than overcome the added cost of pellets.
- Extra handling. A lack of pelleting machines designed specifically for farm needs results in unnecessary hauling and han-

dling of feed. This is especially true in cases where the feed is hauled to the local mill for pelleting.

Here's a quick summary of pelleting research at a number of colleges:

Feeding Pellets to Beef

Washington: Use of all-pelleted feed can save a ton of feed per 1000 pounds of gain. Beef heifers on nonpelleted diet required 905 pounds of feed per 100 pounds of gain. Use of pellets saved 200 pounds of feed for each 100 pounds of gain. Feed costs were around $84 a ton; cost of pelleting about $2 a ton. Other advantages include ease of handling, reduced storage needs, and little or no feed waste from trampling or wind blowing.

Illinois: Pelleted ground alfalfa hay makes an excellent complete ration for wintering steer calves, reports Dixon Springs Experiment Station. Calves gained 1.73 pounds per day compared with 0.62 for chopped alfalfa hay. Besides ease of feeding pellets once a week to calves, the station lists these advantages over conventional feeding systems: More constant feed consumption, less feed wasted, more efficient utilization of feed.

Pelleted complete rations for fattening cattle have been superior in efficiency to complete rations fed as meal when consumed at the same level.

New York: Here is the result of a feeding trial at the Cornell Experiment Station to determine value of ground alfalfa pellets fed with grass silage and mixed hay in wintering rations for steer calves:

Cattle were divided into 4 lots. Lot 1 received grass silage and 2 pounds corn per head daily; Lot 2 received mixed hay and alfalfa pellets; Lot 3 received grass silage and alfalfa pellets; and Lot 4 received mixed hay. Here are the results:

	Lot 1	Lot 2	Lot 3	Lot 4
Average daily gains	1.09	1.49	1.15	1.16
Total dry matter per cwt. gain	954	877	962	1,104

Feeding Pellets to Dairy

Feeding dairy cows completely pelletized rations in which the forage had been finely ground before pelleting has not proved satisfactory in the past. Biggest problem has been lower butterfat content. Researchers feel this is due to decreased formation of acetic acid (the principal agent responsible for the formation of butterfat) in the rumen. Finely ground roughage appears to pass through the rumen so fast there is not time for normal bacterial fermentation of the cellulose in the roughage.

This low fat content has been

partially overcome by feeding 6 pounds of loose hay, along with the ground roughages. Experiments are presently underway to determine how much of the dairy ration can be made up of pellets; also, we need to know how fine we can grind before cutting butterfat.

Feeding Pellets to Swine

North Dakota: In experiments at the North Dakota Experiment Station, pulverizing and pelleting a barley ration for hogs resulted in 12 to 14 per cent faster gains. In addition, 8 to 17 per cent less feed was required per pound of gain as compared to identical ration fed ground.

Washington: Pelleting may be worth from 10 to 40 per cent of the value of the feed, depending on the condition of the feed, say researchers at the Washington Experiment Station.

Nevada: Pelleted and ground growing-finishing swine rations, containing 50 per cent ground alfalfa, were compared at the Nevada Experiment Station. The pelleted ration resulted in 1.7 pounds daily gain, ground ration only 1.5 pounds. The pellet-fed hogs required 558.5 pounds feed per 100 pounds gain as compared to 698.2 pounds for those receiving a ground ration.

Feeding Pellets to Sheep

Wyoming: In comparing pelleted rations with nonpelleted rations, feeder lamb gains have been increased 35 to 40 per cent by pelleting the ration. The feeding period has been shortened by 30 days.

Missouri: Complete pelleting of lamb-fattening rations increased feed efficiency and rate of gain. Feed requirement for each pound of gain for completely pelleted ration of roughages and concentrates was 5.2 pounds; for hay-whole grain ration, 6.3 pounds. Rate of gain, 0.46 and 0.44 pounds daily.

Michigan: Pellets tended to prevent digestive disturbances by keeping sheep from sorting out the more tasty items and overeating. Pelleting is helping solve overeating disease with lambs and ewes.

Agricultural Research Center, U.S.D.A.: Grinding and pelleting can greatly increase palatability of rations containing coarse roughages or dusty and unpalatable ingredients. Lambs will start on pelleted feed faster than on unpelleted feed.

Editor's Note: If you want information and prices of pellet mills, write to one of these manufacturers: Anglo-American Mill Co., Owensboro, Kentucky; Barnard & Leas Mfg. Co., Cedar Rapids, Iowa; California Pellet Co., 1800 Folsum Street, San Francisco, Cal.; R. R. Howell Co., 31st Ave. and 4th Street, Minneapolis, Minnesota.

Corn Nitrogen Guide

How to use supplemental nitrogen for extra profit . . .

Michigan State University

In general, each $10 spent for nitrogen can be expected to pay back $20 to $60 in reduced cost of producing corn. Nitrogen must be applied at the right time in the right way, and there must be enough of the other nutrients. All crops in the rotation should have received adapted fertilizers in amounts which will average 200 pounds or more per acre per year.

Planting-time fertilizer should be used at a rate of 150 to 200 pounds per acre as applied by conventional planters. Deep placement planters which fertilize in a band or bands, 2 inches to one side of seed and 2 inches or 2 and 6 inches, below level of seed may be used for both the regular planting-time fertilizer and, at the same time, all the nitrogen to save cost.

How Much Fertilizer

Corn plants require about 1½ pounds of elemental nitrogen per bushel (shelled) of corn produced. You need 150 pounds per acre for a 100 bushel yield. The amount of nitrogen the soil is able to supply to corn and how much you need to add depends on legumes grown, manure applied and organic matter in the soil.

The need for nitrogen increases with number of plants per acre.

Kinds of Nitrogen

Any of the generally-used nit-

POUNDS OF SUPPLEMENTAL NITROGEN PER ACRE

Previous Treatment of Land	Corn Plants Per Acre		
	8,000	12,000	16,000
Good legume and manure plowed down	0	0	0 lbs.
Good legume plowed down—no manure	0	0	40 lbs.
Manure plowed down—no legume**	0	40 lbs.	70 lbs.
No manure—no legume**	40 lbs.	70 lbs.	100 lbs.

**"No legume" includes sods which contain 50 per cent or less of legumes.

Reprinted from a release prepared by the Soil Science Department, Michigan State University

rogen fertilizers are equally effective. The important considerations are cost of nitrogen, convenience, and supply. Cost means cost per pound of elemental nitrogen (N); not just the cost per ton, bag, gallon, or barrel of the carrier.

Applying Nitrogen

Apply nitrogen either just before planting or soon after, preferably by June 25. Nitrogen may also be applied deep at planting time as explained above under "deep-placement." Dry forms and "no-pressure" nitrogen solutions may be applied either in the soil or on the surface, banded or broadcast. Anhydrous ammonia and "pressure" solutions must be placed in the soil with more or less specialized equipment. Care should be taken not to injure corn roots with these applicators.

POUNDS OF NITROGEN FERTILIZERS TO USE ON CORN TO OBTAIN ELEMENTAL NITROGEN DESIRED

Material	Pounds Nitrogen (N) Desired		
	40	70	100
Ammonium sulfate (20% N)	200	350	500
Ammonium nitrate (33% N)	120	310	300
Synthetic urea (45% N)	90	160	225
Anhydrous ammonia (82% N)	50	85	125
Nitrogen solutions—use according to per cent N guaranteed			

Catch Your Own Fertilizer

Stormy weather may soon be welcomed by farmers instead of being dreaded if an idea being tried out in Central Europe catches on. Technicians there have found out how to harness thunder and lightning to provide free fertilizer.

They have acted on well-known fact that nitrogen is released during electric storms and converted into nitrogen-oxide — which is a valuable fertilizer — by tremendous heat generated. Now gigantic lightning attractors are being put up on farms, which convert silent discharges of electricity into violent thunderclaps which produce nitrogen-oxide. Carried into soil by raindrops, 16 lbs. of extra nitrous-oxide per acre can be induced in this way in one year.

—The Kenya Dairy Farmer, Nairobi

The Renk's Giant Trench Silo

It holds 4,000 tons of corn silage to make beef at lower cost . . .

Condensed from Chicago Daily Drovers Journal

WILLIAM F. RENK & Sons of Sun Prairie, Wisconsin, may not have the largest trench silo in the country, but they have one that will measure right up with the largest.

Dug into a hillside a short distance from the main offices of their farming and seed operation, the big silo has a capacity of **4,000 tons of silage.** The 4,000 ton capacity is utilized when the silage is level with the top. If they heap the silage it will hold more.

A look at the dimensions give an idea of the size of the trench. It is 250 feet long, with an entrance from the road large enough to drive any farm machine through. At the bottom it is 32 feet wide, and it tapers to 60 feet wide at the top. Depth is 14 feet.

Walter Renk, general manager and president of the company, told about construction of the silo, which is used to store silage in their beef feeding operation.

Blown Gunite Walls

The silo cost $8,200 in cash when it was erected and Mr. Renk estimates it would cost one-third more now. In addition to the cash outlay, the Renks' own caterpillar and a hired man were used for a week in digging the trench.

The walls are four-inch gunite blown on under pressure. Before the gunite was blown on, the sides were lined with kraft paper and wire was put around the sides for reinforcement. The bottom of the silo is six-inch reinforced concrete.

It was designed to hold 2,500 tons of silage, but weighing the silage last summer showed the capacity to be better than 4,000 tons.

The corn silage which goes into it comes from the Renk's own production plus refuse they buy from sweet corn canning operations in the central Wisconsin area. The large capacity will carry their feeders through the winter until grass is ready for those that will be graded in the spring.

Reprinted by permission from Chicago Daily Drovers Journal of May 16, 1956, Union Stock Yards, Chicago 9, Illinois

In all, the Renks feed about 1,500 head of cattle annually in their operation. And they usually market about 1,500 hogs—bought as feeder pigs and used to follow the cattle.

The cattle feeding chores are done twice a day and take only a matter of minutes. A fork on the front of a tractor is used to load the high quality silage onto the two wagons used to haul it to the feedlots.

Avarice, in old age, is foolish; for what can be more absurd than to increase our provisions for the road the nearer we approach to our journey's end. —Marcus T. Cicero.

Bunkers line the sides of the feedlot, so the silage is unloaded into them without going inside the lot.

The feeding operation is set up for calves and light yearlings laid in from mid-November to around Feb. 1. The heavier animals are laid in during December and January and are of plainer quality. They are pointed toward market in April, May and June.

The plainer cattle are on silage until the final 30 days in the feedlot, when they are put on a full feed of corn with linseed, cottonseed and soybean meal for supplement.

In May 1956, Renks had on hand 612 steer calves that averaged 420 pounds when laid in, 152 heifers which averaged 342, 153 heifers which averaged 415, and 88 yearlings which averaged 636.

The heifers stay in the feedlot until ready for market, but the steer calves go over the summer on pasture. The heifers get a full feed of silage, plus supplement, and two pounds of corn per day.

After the steer calves leave the winter feedlot they'll go through the summer on alfalfa-brome pasture, where they'll have corn in self-feeders. Market prices in the fall determine what time they'll be finished.

Mr. Renk explained their beef production system, saying, "Calves make the safest bet for the feeder. They don't make money as quickly on a rising market as the short-feds, but there's not as much risk with them."

He figures it's better to spread out the operation rather than concentrate on one enterprise.

The Renk's have been feeding about the present number of cattle for 10 years, and before that, they finished quite a few sheep and lambs for market.

Other enterprises on the 1,117 tillable acres they operate in eight farms are a 25-cow registered Angus herd, 95 head of Holstein cattle in a Grade A milk operation plus the hybrid corn

and certified oat, barley and wheat seed business. They also handle agricultural chemicals, sprays and grass seed.

Walter's son, John, who has recently returned from military service, is planning to raise the hogs which will be fed on the farm. He's crossing Hampshire boars with Chester White-Duroc sows.

"We're starting from scratch," Mr. Renk said. "Disease will determine how much money we'll make with the hogs. Frankly, I'm a little worried about the disease problem with the pigs."

William F. Renk, who is 81, leaves most of the company operation to his three sons, Walter, Wilbur and Robert.

Mechanical Work Important

He's available to give advice from his experience when the sons need it, but they handle most of the operations. Walter handles the financial end of the operation and is general manager and president. Wilbur is in charge of the seed processing and sales, and Robert takes care of the mechanical work.

"The mechanical work is as important as anything on the modern farm," explained Walter. "Equipment is expensive and has to be kept in good repair. Like most farms, we're trying to make ours last longer."

The elder Mr. Renk's father was one of the pioneer farmers of Dane county, coming there in the early 1800s. Since Walter, Wilbur and Robert began farming with their father, they've added five of the eight farms they now own.

Their children are the fourth generation of the Renk family on the farms. Walter has two sons, John and Dick. Wilbur has a daughter, Sue, at the University of Wisconsin, and a son, Steve, in high school. Robert has a daughter, Dianne, in grade school, and a son, David, 5.

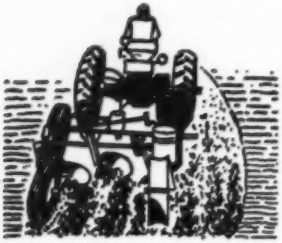
Keeping Cows Off the Farm

Dairy farmers are ready to team with neighbors to hire their cows out to be milked at a central station.

One Iowa farmer got 49 farmers to pledge 815 cows when he proposed to build a milking plant and take charge of feeding, milking, and selling products. Local bank agreed to help him get backing to build the plant.

Dairymen pay 30 dollars a cow as a membership fee and agree to keep all space filled at 30 dollars a cow for the next three years. This brings in $24,000 a year. Estimated cost of buildings and equipment was $125,000. —*Cappers Farmer*

Work Less, Save Up to $5.00 An Acre



Plow planting and wheel track planting save up to five trips over the field. You save about $1.00 an acre per trip . . .

Condensed from Farm Journal

A Farm Journal Field Staff Report, Edited by *George W. Wormley*

THIS year, 1958, promises to be the biggest yet for "plow-planting." More farmers gave the idea a whirl this spring, and scientists are putting real push behind it, too.

And well they might. "You cut costs and boost yields at the same time," say farmers already doing it.

Out of 76 Wisconsin farmers who planted in wheel tracks last spring, only one plans to give it up this year, reports a University of Wisconsin survey. That's a 98% "catch!"

In eastern Minnesota, 21 farmers who kept close records in 1956 averaged 95.1 bushels of corn per acre on regular, well-worked seedbeds. Where they planted in rough, fresh plowing, their corn made *about four bushels more*—98.9 bushels per acre.

In Michigan last year, experiment station scientists pulled into 16 fields in six counties with a plow-planter—a rig that plows and plants at the same time. They put in corn right alongside rows that farmers were planting with other methods. Last fall, the *plow-planted corn averaged 11 bushels more per acre.*

Yields tend to go up because you get better soil tilth, hold onto more moisture and save topsoil by planting in rough plowing, say scientists. At the USDA's Coshocton (Ohio) experiment station, summer run-off from straight-rowed corn on a regular seedbed measured 3.65 inches; from contoured rows, 1.67 inches, and from contoured *plow-planting,* only .21 inch.

The straight rows lost 7 tons of topsoil per acre; the con-

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

toured rows, 1.28 tons, and the plow-planting, only .03 tons!

You can figure that you cut costs about $1 per acre for every trip over the field you save, say scientists at Indiana's Purdue University.

Agricultural economists urge parents of farm boys to appraise their sons' abilities and opportunities early enough to permit them to study and train for nonfarm vocations. This is necessary since there are only about 12 to 15 opportunities each year for young men to start farming for every 1,000 farms.

"Total savings can amount to as much as $5 per acre in fuel, labor and machinery," adds Wisconsin scientist Arthur E. Peterson. *"On 100 acres of corn, that's $500."*

The system has some drawbacks. For one thing, fields don't look as good.

"Dad was so ashamed of our first wheel-track planted field, that he went out and rolled it with the culti-packer," says Orla Shethhelm, Ingham County, Mich. "But that was three years ago. We've been averaging more than 100 bushels per acre ever since."

Biggest hitch is probably timing. Most farmers say you get the best results by plowing just ahead of the planter. Scientists agree that when the soil is just right for plowing, it's usually best for planting.

This means you delay plowing until planting time and that limits planting speed—unless you have extra plows and tractors. In sod, delayed plowing may give soil a chance to dry out too much.

Good plowing is a must. And even then you may not get a good seedbed without some extra work on heavy, or "problem" soils.

"My soil is tough and stays wet. It packs too much for regular wheel-track planting," says Charles Perfect, Licking County, Ohio. "So I rigged up my planter to put the seed right at the edge of the wheel tracks, and I still save $5 to $8 an acre."

Here's a system that takes some of the gamble out of late plowing: Delay plowing so that you can just get it done before planting time. And plow your heaviest soils first.

Then use wheel-track planting on the fresh plowing, and if a rain hits before you're through, you can disk, harrow and finish up with regular planting.

During last year's wet spring, Jim Howe and Andy Shugars, Van Buren County, Mich., fixed

up their planter to work plowed ground that was too wet for wheel-track planting.

"Wheel-track planting is just the ticket when you can wait for conditions to be just right," says Howe, who was one of the first to try it. "But we have 1,000 acres to plant and these new refinements give us an earlier start."

Another big advantage that scientists see in planting in rough, plowed ground is fewer weeds.

"You can save at least one cultivation, probably two—especially if you use a pre-emergence weed killer," says Illinois scientist Earl Spurrier.

If you're interested in more details on the idea, scientists at Michigan State University have prepared a bulletin on "Minimum Tillage" that describes different methods and machines. You can probably get a copy by writing the Bulletin Office, Agricultural Hall, Michigan State University, East Lansing, Michigan. If you live outside of Michigan, include 10 cents to cover costs.

Causes of Corn Lodging

In 1956, University of Minnesota extensionists found loss from stalk breakage and lodging amounted to about 5 to 10 per cent of the Minnesota crop. Some of the causes are:

1. Root and stalk rot.

2. Insect damage. Corn borers, corn root worms, wireworms and other insects may weaken stalks, causing them to break and drop the ear.

3. Nutrient balance. When the fertility level of soil is out of balance — especially when potash level is low — stalk rot may develop faster and cause more lodged plants. Also, research and observation indicates that applying nitrogen alone favors stalk rot.

4. Plant populations. Stalk breakage and lodging increases when there are more than 18 to 20,000 plants per acre.

5. Corn variety. Different varieties vary in their standing ability, an important factor.

6. Treatment with 2, 4-D. This herbicide sometimes causes brittleness when sprayed on corn for a period of about 10 days following treatment.

The best solution is in using resistant hybrids, insect control, proper fertilizing, correct plant populations and good crop management. —*American Agricultural Reports*

Gophers Flee from 2,4-D

No one knows why, but spraying with 2,4-D reduced gopher populations 87 per cent in Colorado tests . . .

Condensed from Colorado Farm and Home Research

NEW STRATEGY has been adopted in the age-old battle of man against the pocket gopher.

Instead of fighting underground where the gopher is in his element, the scene of action has moved to the surface and it looks like man finally has the upper hand.

Man's big weapon is 2,4-D, as demonstrated in tests conducted jointly by biologists with the Colorado Agricultural Experiment Station, U. S. Fish and Wildlife Service, and the Rocky Mountain Forest and Range Experiment Station, U. S. Forest Service.

The scientists found that spraying rangeland with 2,4-D gave 87 per cent control of gophers.

Dr. Richard S. Miller, project leader for the Experiment Station, said it is not yet known how the herbicide acts to reduce the number of pocket gophers. Further research may produce the answer, he added.

A butyl-ester formulation of 2,4-D was applied on some 2,000 acres of rangeland on the western part of Grand Mesa, located in Mesa County. Spraying was done by airplane with diesel oil acting as the herbicide carrier. Rate of application was three pounds of acid per acre.

The average value of milk cows increased from $147 to $176 per head during 1957, according to the U.S.D.A. The downturn in cattle numbers in 1956 caused the increase in average value of milk cows.

Then one-acre plots were selected for sampling of vegetation and gopher numbers before and after treatment by 2,4-D. Five plots were located within the area to be treated, while control plots were some distance away.

Within a year after treatment, gopher numbers on the control

Reprinted from Colorado Farm and Home Research, Colo. State University, Ft. Collins, Colorado

plots increased 9 per cent. On the sprayed areas, however, populations decreased 87 per cent. Analysis also showed more grass and fewer weeds as a result of the spraying.

If future tests confirm the first year's results, the 2,4-D method can be beneficial in two ways, Dr. Miller said. These benefits are 1) gophers may be controlled at a much lower cost than the present poison bait methods, and 2) rangelands will be improved for grazing livestock.

In upcoming experiments, the cooperating agencies hope to find answers to a number of problems. They want to know the way in which an herbicide such as 2,4-D acts to reduce gopher numbers, how large an area must be treated for effective control, how long this control remains effective, and the economic value of control by herbicides if they prove suitable for treatment of large areas.

Prevent Rather than Cure Soil Compaction

Excessive use of heavy machinery in farming operations tends to pack certain types of soil into unproductive hardpans or to form hard layers of soil just below depth. This condition cuts the soil's ability to absorb water at the surface as well as slows the permeation into the subsoil. In some cases normal root development of planted crops is restricted.

Once soils become compacted, the hard layers must be broken by subsoiling, deep tillage or plant roots. But prevention is still the best way to deal with the problem.

Machine operations should be delayed if the soil is wet. Damage is frequently done shortly after rainy spells when farmers become alarmed about the lateness of the season or vigorous growth of weeds in cultivated crops. The soil's resistance to compaction can be increased by adding to its organic matter content through rotation with grass or pasture plants. Too, cover crops can be grown in off seasons and turned under as green manure before cultivated crops are planted.

Soils specialists suggest developing a minimum tillage system for the farm. That is, tilling the soil as little as possible. This requires judgment on the part of the operator. Local county agents can offer advice about practices adapted to your area.

—Texas A. & M.

Yes, Hay Crushers Can Cut Field Risks

They can reduce field curing time and exposure to weather, but when you mow and crush it is critical. Here are results of Iowa tests . . .

Condensed from Iowa Farm Science

Kenneth K. Barnes and Robert C. Fincham,
Iowa State College

USING hay crushers for "hay conditioning" can reduce field curing time substantially. If crop and weather conditions normally require 2 days for field curing, for example, conditioning can cut this to 1 day. If 3 days are normally required, it can be cut to 2 days. *But timing of the hay mowing and the conditioning process must be "right."*

Hay crushers are essentially two rollers held together by spring tension or by the weight of the upper roller. In some machines the rollers are deeply corrugated and mesh together like gear teeth; in others the rolls are smooth. A hay crusher picks up a swath of freshly mowed hay and passes it between the rollers. These crack open the stems, allowing them to dry more rapidly than uncracked stems.

Many dairymen recently have been trying to improve the quality of hay fed to their herds as a means of reducing feed costs. Top quality alfalfa hay fed generously (2½-3 pounds per 100 pounds of live-weight) can provide all of the protein needed to balance a ration when a good home-grown grain mixture is fed according to production. Such feeding has enabled some dairymen to maintain 450-500 pound butterfat averages year after year without additional protein supplement.

Two Steps . . .

The key to high-quality alfalfa hay is (1) to cut the crop early, at about one-tenth bloom and (2) to prevent weather damage in the field. Early cutting is vital. With large acreages, it may be necessary to start mowing when blooms first appear, so that haying is completed before the crop is overmature. Early cutting, however, is the one thing that

Reprinted from Iowa Farm Science, Iowa State College, Ames, Iowa

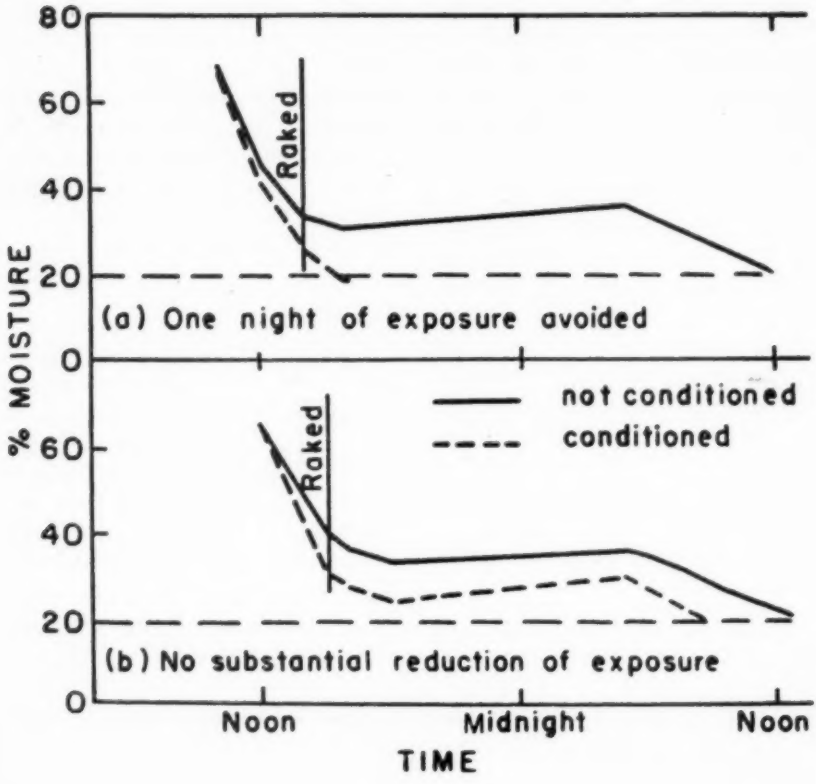
can be done with only a little cooperation from the weather.

The importance of early cutting is indicated by a USDA study comparing the digestible protein yield per acre at the early bloom and full-bloom stages:

Alfalfa cut at the early bloom stage yielded 1,106 pounds of digestible protein per acre. Comparable yield at the full-bloom stage was 722 pounds. The loss in digestible protein, thus, was 384 pounds. It would take about 1,000 pounds of soybean meal to replace this loss per acre from delaying cutting. So at current prices, it would cost $30-$35 to replace the protein lost each acre for three cuttings.

The weather damage problem, however, is less easily solved, though more rapid field curing

Typical Drying Patterns for Crushed and Uncrushed Hay.



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certainly appears to be one answer to weather risk, the haymaker's biggest problem. Hay that's rained on loses both its color and—what really counts—much of its nutrient value.

The increasing use of barn driers and hay crushers indicates that many dairymen believe this equipment can materially reduce the time that the crop is exposed to the weather. And dairymen using either or both of these consistently store a higher percentage of their hay crop without weather damage.

How Much Help?

To what extent can using a hay crusher reduce the weather hazard? To find out, we made a number of field tests last summer—both to evaluate the hay crushing process and to pin down the conditions under which it would reduce field curing risks. We mowed swaths of hay at different times of the day and processed some through the crusher and left others untouched. Then we took periodic readings of the moisture content of the hay to compare the drying rates.

The chart shows some typical results. The top part of the chart shows the moisture picture for brome-alfalfa hay mowed at 10 a.m. The hay dried rapidly under the particular weather conditions of the day. The crushed or "conditioned" hay was ready to bale by 4 p.m. The hay not conditioned didn't get down to a safe baling moisture before evening, and it actually picked up moisture again during the night. We've come to refer to the period from 6 p.m. to 6 a.m. as "field wetting time."

In the test illustrated, the hay mowed at 10 a.m. and not crushed wasn't ready for baling until noon of the following day. Crushing, in this test, avoided a night's exposure to weather and potential rain.

Now look at the bottom part of the chart. Here, the hay was mowed at noon. Again, the conditioned hay dried faster than unconditioned hay. But with mowing at noon, even the conditioned hay didn't dry to baling moisture by nightfall. Under these circumstances, there was little or no advantage to crushing from the standpoint of reducing field curing risks.

Notice also that during the "wetting" period the crushed hay picked up moisture more rapidly than did uncrushed hay. While there was an 8-per cent moisture difference at 6 p.m., the difference was only 4-5 per cent by 5 a.m.

About raking: We raked both conditioned and unconditioned hay at the same time—and both at too low a moisture content. California tests have indicated that raking hay below 55 per

cent moisture results in relatively large leaf shatter. But raking at high moisture, on the other hand, reduces the drying rate. From practical over-all considerations, we'd normally recommend raking at between 40 and 50 per cent moisture.

Because of late raking, small windrows and excellent weather, the hay in all of our tests dried more rapidly than would often occur in a typical haymaking situation. More often, both the crushed and uncrushed hay would be in the field overnight, and the crushing would avoid the second night of exposure. Use of a hay drier together with a hay crusher, however, would make it possible in some situations to put up hay cut early in the day without any overnight exposure.

The hay crusher should be operated shortly after hay is mowed—before the material has wilted.

We've found the most efficient operation is to pull the crusher directly behind the tractor doing the mowing job. This way, the crusher is always operating on the swath mowed the previous round, and no separate trip through the field is needed.

Other Benefits?

Use of hay crushers or conditioners has increased considerably in the dairy section of northeastern Iowa in recent years. Those using them report that they're able to make better hay more consistently than without them. They also report improved palatability of the crop—crediting this to a softer texture, especially for the coarse-stemmed first cutting of alfalfa. And, with less weather damage, more of the leaves are retained; this also improves the palatability. They indicate also that more of the crop is eaten when the hay has been crushed compared with uncrushed hay from the same field.

When hay is cut at the early bloom stage rather than half- or full-bloom, the dairymen report that the hay conditioners are more valuable in terms of reduced curing time; early cut plants contain more moisture than the more mature plants.

In Brief . . .

Hay conditioning can reduce field curing risks *if* hay mowing and conditioning is timed right. The value of this saving depends on how the weather turns out on the night of exposure saved. If it rains that night and possibly for several nights following, the entire value of the hay cutting may be saved, and this could go a long way toward paying for the $700-$800 crusher. If no rain occurs on the "saved" night, there'd be little or no value from conditioning from the standpoint of nutrient savings. But you'd still have the benefits

of improved palatability reported.

Dairymen who have hay conditioners pretty well agree that they're an important machine in making high-quality hay. Over a period of years, they could easily pay for themselves through saving the protein in high-quality hay that would otherwise have to be purchased. All considered, the hay crusher looks like a good investment for the man who can make profitable use of quality hay.

Wheel-Track Planting Protects Soil, Fights Weeds

Wheel-track planting can be a powerful antidote for soil erosion and weed problems in the corn field, a Steele county farmer has learned. Marvin Meixner last summer compared wheel-track planting with conventional corn planting on his farm near Owatonna, Minnesota, and this is what happened.

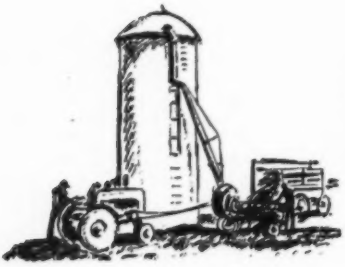
Corn planted by the wheel-track method yielded 70 bushels per acre—five bushels more than where he planted it in the usual way. There was less soil erosion in the wheel-track planted corn and weeds didn't grow as well there. Besides, Meixner found there is much less field work involved in wheel-track planting. This practice means hitching the planter so it plants in the wheel tracks of the tractor on undisked, but freshly-plowed land.

Meixner made the comparison on yellow clay soil. On one part of the field, he spring plowed, disked the field, went over it with a spring tooth and dragged it. He planted corn, dragged the field once more and cultivated the growing corn twice. On the other part of the field, he spring plowed the land, planted the corn in the tractor wheel tracks with no further field tilling and cultivated only once.

Why did wheel-track planting bring such good results? J. Russell Gute, Steele county agent, explains it this way: The soil compaction caused by the tractor provides the only seedbed preparation necessary. This leaves the soil loose between the rows and provides a poor seedbed for weeds.

With regular seedbed preparation, weed seeds usually have two or three days head start on the corn, meaning the farmer must cultivate the corn when it is small. This cultivation, unless done very carefully, can kill many corn plants. But with wheel-track planting, corn and weed seeds in the row germinate at the same time, while weed seeds between the rows remain "dormant." That means the corn is usually 6-12 inches high before any cultivation is needed.

Corn Silage the Year Around



A pastureless system may not be right for everyone, but the Carnes are pleased with the way it works for them . . .

Condensed from The Furrow

SUBSTITUTING silage for pasture in the dairy herd ration the year around is becoming a reality on many dairy farms each year. Now more than ever, modern equipment, improvements in feed, rising land costs, and other factors, contribute to making the thought of bringing feed to cows more attractive than trying to maintain a pasturing system.

A practical version of this has been tried and proved on the Fay Carnes and Son dairy farm in Jefferson County, Wis. No waiting for liquid or pelleted feeds—the Carnes' herd has been on a no-pasture system for more than 10 years. Corn silage and hay constitute the forage part of the herd's ration the year around.

Advantages Fay and his son, Howard, list for their pastureless setup are: no time lost chasing cows, elimination of rotation grazing, fewer fencing problems, closer herd supervision, no trouble with bloat, manure can be spread where it's needed most, and uniform milk production. Their cows take to good corn silage as eagerly as if turned onto lush new pasture. An average cow will consume about 35 pounds of silage and 15 pounds of hay per day. These Badger State dairymen have tried variations from their corn silage and hay forage, but always return to this feed combination. "We tried grass silage when it first became popular, but our cows were too old fashioned to change their ways," claims Howard.

During the winter, cows are turned into an adjoining cement lot where they move around and exercise while the barn is cleaned, new bedding is spread, and silage troughs are filled. In the

Reprinted by permission from The Furrow, Moline, Illinois

summer, cows have access to a 5-acre exercise lot, where they soak up sunshine missed during winter months. Plenty of shade and water are available here, too. The cows vouch for the system—citing a herd average of 500 pounds of butterfat.

Getting new silage harvesting equipment doesn't necessarily mean a farmer can put up silage faster. A survey conducted last year by Michigan State University farm economists shows that performance rates between farms using the same type of equipment can vary up to 10 tons per hour.

The senior partner of the Carnes team has been raising purebred Holsteins for 50 years. During this time, cows from his farm have gone to herds in nearly every state in this country, plus Mexico and Cuba. He saw what was probably one of the first milking machines tried in Wisconsin installed in his barn as an experiment. Carnes said, "It worked, but we spent more time keeping the thing running than we would have used in milking by hand."

During the years, the Carnes family has been alert to let their experiences, as well as recommendations from experiment stations, help them improve their dairy enterprise. One experience made a big change in their views on raising calves for top production. Fay Carnes reports, "When my boys were showing in 4-H club work they groomed what seemed to be the finest calves in the herd. Naturally these calves were fitted and fed with care until they appeared to be outstanding. We soon learned, however, that these pampered calves never came close to reaching the high production rates of their sisters that stayed at home and tended to business.

Fall turkey prices will be slightly lower this year, believes a Michigan State University farm economist. Expected heavy placement of poults through June will push fall supplies up.

Today, calves receive plenty of leafy green alfalfa hay as soon as they're likely to nibble a leaf. Alfalfa hay seems to give them the needed capacity for higher production later on. Water, however, is rationed because some calves will stand and drink water all day and eventually develop a pot belly that later appears to become a handicap to top production. For this reason, all calves are hand watered twice daily.

Howard and Fay Carnes have also learned the importance of

good housing. For very young calves, cold drafts contribute to scours. The Carnes team has experienced this calf raising problem, but not since they built solid-wall partitions around and between pens. The solid partitions keep cold winds from blowing directly on calves, and help to insure a healthier start in life.

All replacement cows for the herd are raised on the farm. Among other advantages, the Wisconsin dairymen list this as an important disease-control factor. Heifers are bred to a yearling bull, but after they reach the milking herd they are bred artificially.

Howard and Fay Carnes are first to admit their pastureless system might not be right for everyone, but they are pleased with the way it works for them.

Insecticide in Fertilizer Pays on Corn

A little insecticide in the fertilizer pays big dividends when there is a heavy rootworm infestation on corn land. University of Wisconsin entomologist J. W. Apple prevented lodging and got increased yields with small amounts of aldrin or heptachlor insecticide mixed with starter fertilizer in cooperative tests with farmers last year.

The fields used in the test had been in corn constantly for five or six years and the soil harbored many rootworms. These insects are generally serious on land that has been in corn longer than three years in a row. In untreated rows, about one-third of the corn plants were lodged. Practically no plants were lodged in rows which had received the insecticide in the fertilizer.

There was an increase in yield on the fields, too — five per cent more corn in one field and more than 20 per cent yield increase in another. Apple points out that yield increases from the treatment would have been higher if the corn had been picked mechanically. He picked it by hand, so was able to harvest ears from lodged stalks which a corn picker would probably miss.

Farmers can buy 10 pounds of insecticide in fertilizer for about $25 per ton more than for untreated fertilizer, Apple points out. Thus, at normal fertilizer rates, the protection costs about $1.25 per acre. The same treatment also provides some protection against wireworms and white grubs, he says.

—University of Wisconsin

Ailments of the Little Pig

An English Veterinary Surgeon writes this simple guide on how to keep litters healthy. His suggestions are pithy, to the point . . .

Condensed from Farmer and Stock-Breeder

IT IS the very young and the very old who are most subject to disease, the young because natural immunity or resistance has not had time to develop and the old because immunity is wearing a bit thin. Pigs are no exception to the general rule and the conditions and illnesses which attack piglets from birth to four months are legion. Many of them are due to poor management and a failure to observe simple commonsense procedures.

In farrowing itself, losses from suffocation, overlaying, cold and damp amount to a shocking number each year. On a farm which I know very well they lost 46 new-born piglets in three nights from cold alone during a very cold snap in 1956. It is no good having infra-red lamps if the draught under the doors and through the walls reach hurricane force on a cold night.

Draught-proof Pens

Remember, hot air rises and the cold air rushes in under that lamp at floor level to replace it. It is not a difficult job to render a farrowing pen draught-proof with sacks, wire netting, straw and even a bit of board nailed up over the worst holes. Lamps should be in good working order, hanging behind a small creep in one corner about 18 inches to two feet from the floor. I am all in favor of covering in the top of the creep to prevent heat loss.

And how much trouble is it to put up safety rails round the pen?

Starvation from failure of the sow to produce milk is a cause of heavy loss at or just after birth. The common causes are retained afterbirth, infection of the uterus after farrowing (farrowing fever), constipation, glandular upset in the sow, or, of course, infection of the udder itself.

Routine Practice

Constipation in the farrowing sow is your fault. Some pig farmers I know make a routine prac-

Reprinted by permission from Farmer and Stock Breeder, Dorset House, London S. E. 1, England

tice of having all sows injected with penicillin at farrowing in an effort to avoid infection, but whatever the cause of the milk loss veterinary attention is required at once—not in 36 hours' time.

Have you got sow's milk supplement all ready just in case, and some glucose, too?

"Injectable iron" treatments are the best way known today to prevent pig anemia if used by the time pigs are two or three days old.

It is astonishing how many piglets can be saved by glucose and water in a shallow trough under a warm lamp for 24 to 36 hours, when the sow's milk does not appear and when they will not take sow's milk supplement. A 5 per cent glucose injection under the skin in daily doses of 10-20cc for three or four days has saved piglets by the score.

Suppose that we have got the piglets born safely and the sow is milking well. What can we look out for now?

Joint ill or navil ill is one of the common conditions in the birth-to-three-week age group. Due to dirt, the navel of the piglet becomes infected at birth, and this is followed by abscess formation and swollen joints and death in severe cases.

Prevention lies in cleanliness and even dabbing the navel of new-born pigs with antiseptic.

Piglet anemia is commonly seen at three to eight weeks at all times of the year, but it is frequently associated with autumn and winter, damp and cold. In spite of many first-class "do-it-yourself" remedies, anemia still takes a heavy annual toll.

Outdoor rearing, with its ready supplies of iron, does appear to reduce the incidence considerably, but not everybody can afford to rear outdoors.

Symptoms are really too well known to need repetition—paleness, whitish-colored diarrhea and breathlessness on exercise. Prevention and treatment lie entirely in your hands. Indoor piglets require dryness and warmth. Allow the sow plenty of time at grass while she is pregnant. If this is impossible then feed iron to her in her food during the pregnancy period.

Turf to Root In

Place turf and sods in the farrowing pen for the piglets to root in; fortify the creep feed with an iron tonic; and give intramuscular injections of one of the well-known anti-anemia preparations.

Round worms and long worms are associated with outdoor rearing on ground which is "pig-sick." The common symptoms are unthriftiness, diarrhea, strain-

ing, coughing, depraved appetite, pneumonia and anemia.

This is just another of the "poor management" diseases. Routine round worm dosing of sows before service or in early pregnancy with one of the well-known remedies, the provision of clean land, the observance of hygiene in the farrowing pen, could avoid all this trouble.

Virus pneumonia is often seen in the three to 24-week-old pigs, with its characteristic coughing and pneumonia. The diagnosis of this disease is a matter for laboratory examination, and should you suspect its presence I would suggest that you sacrifice one piglet in order to reach a correct diagnosis rapidly.

If a diagnosis of virus pneumonia is confirmed then get rid of the carrier sow at once. Your first loss will be your smallest.

This disease is associated with indoor rearing in cold, damp conditions, especially in the winter. Though its actual losses in younger pigs are not often heavy, its effect in the fattening house later on can be dramatic and disastrous. Out door rearing in runs away from virus-free sows are the only ways completely to conquer the disease.

Paratyphoid and necrotic enteritis can be the cause of heavy losses up to four months of age. The pigs are "dirty-looking," with scabby skin eruptions, wasting, purplish discoloration of the skin of the ears and tail, scouring and coughing.

Poor hygiene, damp, cold, pig-sick land and malnutrition are the pre-disposing causes.

The most effective treatment would appear to be heavy internal doses of sulphonamides or other antibiotics combined with careful nursing and feeding and warmth.

Most of the feeding value in legume hay is found in the leaves. For example, alfalfa leaves contain 20-25 per cent protein, while the stems contain less than 9 per cent. Loss of leaves in making hay therefore reduces protein and lowers total yield.

Scouring in general is probably the most serious problem affecting young pigs. It is no good these manufacturers of antibiotics telling us the "scours will be prevented by the use of such and such." We have all seen piglets which have received antibiotics in sow's milk supplement from 10 days' of age scouring like mad and, what is perhaps worse, laboratory examination of feces has shown them to be passing bacteria, which are resistant to the antibiotic.

The prevention of scour lies in better management and hygiene. Scouring in very young pigs is

associated with changes in the sow's milk, possibly due to a change in feeding of the sow or to constipation, or when she comes in season again, or change in feeding of the young pigs from sow's milk to solid food.

True *B. coli* scours are often seen when piglets have not had colostrum and are kept in cold, damp surroundings. Remember that all pigs carry *B. coli* in the bowel and that anything which gives rise to a digestive upset will cause an increase in the number of *B. coli* and scour will result.

New Disease

Other causes are piglet anemia, necrotic enteritis, swine fever, round worms, and now a disease seen quite recently in East Anglia which is thought to be similar to the . infectious gastro - enteritis seen in the U.S.A.

No scouring should be treated lightly. You are well advised to contact your veterinary surgeon at once. The cause of the scour can then be ascertained and the correct measures put into operation at the earliest possible moment.

How Many Plants Per Acre of Corn?

An easy, accurate way to estimate number of corn plants per acre is suggested by agronomists of the U. S. Department of Agriculture. Farmers can use this formula in checking corn or other plant populations to determine the effect of planting rates on yields.

Here is the simplified method, devised by Arthur M. Brunson of USDA's Agricultural Research Service, stationed at Purdue University, Lafayette, Indiana:

1. First measure the width of a dozen or so rows of corn in your field and find the *average width per row.*

If this average row width is:	Measure off row segments of the following length in 10 typical rows:
36 inches	14 feet, 6 inches
37 inches	14 feet, 2 inches
38 inches	13 feet, 9 inches
39 inches	13 feet, 5 inches
40 inches	13 feet, 1 inch
41 inches	12 feet, 9 inches
42 inches	12 feet, 5 inches

2. Then count the number of corn plants in each of the 10 row segments and find the *average number of plants per segment.*

3. Multiply this average by 1,000. The answer is the approximate number of corn plants per acre in your field.

—American Agriculturist

How Hazardous Is Lamb Feeding?

Not too risky, say experienced farmers. They like the short feeding period and similar investment . .

Condensed from Missouri Ruralist

Cordell Tindall

AMONG the more profitable ventures on Missouri farms in the last few years has been lamb feeding. Last month lamb prices were bringing smiles to feeders. But there has been no rush to feed lambs. In fact, Missouri feeders had 3 per cent fewer lambs on feed at the first of this year than the previous year. Nationally, there were 8 per cent fewer lambs on feed.

Just as with other phases of the sheep business, it seems there are many farmers who just don't like sheep feeding. This business does require skill and know-how and losses can be severe for the amateur feeder.

It's more difficult to get financing for lamb feeding than for other farming operations, one Missouri feeder reports. His banker was quite reluctant when first approached, now considers it a good risk.

Just how hazardous is lamb feeding? We visited a group of veteran feeders last month to see their operations, get their viewpoints on this venture. To a man they agreed lamb feeding is less risky than cattle feeding, largely because of the shorter feeding period. Prices are not as likely to fluctuate so rapidly in this shorter time. Nothing is a sure thing in farming, but moderate lamb feeding profits seem to be pretty close to it. Less capital is needed for lambs.

Vaccine for overeating disease has done a great deal to eliminate one hazard. All agreed overeating disease was the biggest problem—now some feeders virtually ignore it.

But feeder lambs still have the annoying trait of dying suddenly. Sometimes the feeders know the reasons—sometimes they do not. Some feeders figure a loss of 3 per cent normal but others reported losses down to 1 per cent or less. Invariably, there are a few losses.

The feeders do not agree on methods of holding down over-

Reprinted by permission from Missouri Ruralist, Fayette, Missouri

eating disease other than vaccinating. Some think it's connected with high protein, reduce protein. Others include bulky feed in ration like ground hay and report little trouble.

Scientific name of overeating disease is enterotoxemia. The USDA Year Book of 1956 states: "Most investigators agree enterotoxemia is of nutritional and bacterial origin, the predisposing cause being the overeating or gorging by the animal of highly nutritive feed ingredients, which causes a digestive disturbance and creates an ideal environment for the multiplication of the organism Clostridium perfringens Type D. This organism is commonly present in the stomach and intestinal tract of normal, warm-blooded animals and in the soil."

All lamb feeders visited give their lambs a shot of bacterin as soon as the lambs arrive. In most cases that ends the trouble.

Other hazards of lamb feeding are, of course, dogs and the perverse nature of sheep.

On the other hand advantages of lamb feeding are obvious, too. One is the wool clip, often an "extra coupon." It's necessary to clip the lambs at least 60 days before selling them to get a good pelt at market time.

Length of feeding period, of course, varies but 3 months is a minimum feed. This may stretch out a little.

Lamb feeding operations have not shown the revolutionary trend we find in hog, cattle and poultry feeding. We found less mechanization or automation, even tho we visited top-notch, progressive feeders. Lamb feeding equipment is, for the most part, simple and inexpensive.

Nearest thing to a new wrinkle we found in lamb feeding was at the farm of Andy Bass, near Columbia. Mr. Bass has a partner, Bobby Garrett, and 2,000 lambs were on feed there last month. Half of this group were confined to a concrete lot that actually was built as a king-size pig parlor. A big polebarn is paved and open to the south and a concrete floor extends well in front of this building. A metal fence serves as a windbreak on the west side of the lot.

The lambs are pretty thick in this area, but this seems to be of no importance one way or another. The lambs are self-fed a ground mixture of milo grain, alfalfa hay, molasses and supplement. A portable grinding and mixing mill comes to the farm for this operation. Lambs are fed about 2 pounds of grain a day on full feed. The grain is gradually increased. Lambs are vaccinated and wormed the day they hit the farm. This year they got a second shot of wormer about 21 days later.

Run Lambs in Milo

The lambs were run in a milo field when they arrived, a common practice among lamb feeders. They already had been clipped by mid-February. First lambs were purchased in November, all will be gone by May.

Mr. Bass pens his lambs all the time they are on the farm, even when they are running on milo. He apparently has more trouble with dogs than other feeders visited. A lantern is hung in the pen out on pasture and floodlights are operated the night thru at the concrete floor.

Why does Mr. Bass like lamb feeding? He's been doing it since the thirties. For one thing he notes the work comes during winter months, does not interfere much with cropping operations.

He is able to utilize some roughage feed, altho lamb feed must be of high quality. All feeders agree with this.

Another lamb feeder using a ground feed of milo, alfalfa, supplement and molasses is Ralph Johnson, of Monticello. This Northeast Missouri feeder fed about 640 lambs this winter. He put some in milo fields as early as August. He headed for a February market, which was a good one, with his heaviest lambs.

He grinds a mixture of 13 bales of alfalfa hay, 125 pounds of soybean meal, 125 pounds of molasses and 25 bushels of milo grain.

This gives him a daily ration of 1.94 pounds of grain, 1.34 pounds of hay, .18 pounds of bean meal, and .23 pounds of molasses. This is a total of 3.69 pounds of feed a day.

He believes the cost of grinding charged by the portable mill and mixer well worth while and reports practically no trouble with overeating disease now.

Strip-grazing, green chopping or storage feeding can boost the carrying capacity of productive pastures from 15 to 30 per cent.

Instead of self-feeding he puts in as much feed as will be cleaned up in a day. He feeds only once a day, filling troughs with a scoop shovel.

Mr. Johnson stresses the importance of plenty of water during cold weather, and is supported by other feeders in this. He uses a continual stream of water flowing from ponds to prevent freezing.

"In extreme cold weather the lambs wouldn't be gaining at all if it wasn't for that running water," he comments.

John F. Schuette, Leonard, who fed 2,520 lambs last year, feeds molasses directly from barrels to his lambs. He also feeds shelled corn, alfalfa and supplement. He buys and sells dur-

ing most of the year except for the hot summer months.

What about lamb feeding operations on a smaller scale? Ray Kelly, Browning, has worked out a plan that is worth the attention of older farm couples. Tiring of the heavy work of milking dairy cows, Mr. and Mrs. Kelly have turned to a combination of sheep and poultry to lighten the farm labor. And it has worked out nicely.

Normally, Mr. Kelly feeds 2 carloads of lambs a year, one in winter and another in summer. He likes lamb feeding on his relatively small farm (160 acres) because less capital is required than for cattle feeding, and it's not necessary to follow sheep with hogs.

Likes Lots of Pasture

Mr. Kelly feeds out on pasture during much of the year, gets much of his gains from grass. In winter he feeds a ration of loose hay, soybean meal, grain and "plenty of water and good salt." Last year he put cornland in the soil bank, grew milo for his sheep and poultry.

Last fall he was unable to get northwestern lambs (they were high), so he bought a flock of 104 ewes. He plans to creep-feed the lambs.

"Watch for the February drop" in fed lamb prices, he warns.

Just a little cautious about handing out advice on lamb feeding is Lloyd Rumph, of Mercer. Not long ago he appeared on a sheep producer's program sponsored by the Missouri Agricultural Extension Service and no sooner had he done so than he began to lose lambs. His losses ran about 6 per cent. At the time of our visit this trouble apparently had been checked. This indicates that all of the danger has not been removed from lamb feeding.

Mr. Rumph fed 1,600 lambs this winter, feeds only in winter months. He had lambs of different ages and assorted breeding. He feeds ear corn with the idea it holds down trouble from overeating disease. Ears of corn are simply placed in small troughs. He also feeds linseed oil meal.

Prefer Northwest Lambs

All of these feeders visited preferred northwest lambs—when they could get them at good prices. Last fall Kansas had a big fall wheat pasture crop and took up the lambs from the northwest at higher prices than Missouri feeders were willing to give.

Here's one other thing all feeders had in common — they like sheep. This was at once obvious in their enthusiastic conversation.

So it appears lamb feeding is a profitable venture — for the expert.

Dwarf Corn and New Hybrid Varieties

Corn varieties will change rapidly. You may have good dwarfs by 1960 . . .

Condensed from Prairie Farmer

Jim Lilly

MANY NEW hybrid corn types will be here in a few years. Undoubtedly, they will make a lot of difference in your corn-growing practices. Dwarf corn may be the first of the newcomers.

Experimental work is well along with dwarf-corn varieties and they may be available as early as 1960. Another new variety that is resistant to northern and southern leaf blight, both of which can cause big losses in outbreak years, should be out about the same time.

Corn breeders have also started work on a stalk-rot-resistant hybrid but won't predict when it will be available. Experimental cornborer-resistant lines are also being developed at the University of Illinois and may be on the market before too long.

Corn breeders are also thinking up ways to get more corn on a plant. Purdue plant breeders have just started on a program aimed at getting two ears in place of the usual one.

They are using a popcorn-dent-corn cross in some of their work. Also they are experimenting with some prolific varieties that normally carry two ears a high percentage of the time.

Plant breeders are also working with the kernel in various ways. Illinois has been working for many years on a high-oil corn. This corn would be valuable to both the feeder and corn products processor.

Illinois researchers say that the protein should be higher and more suited to livestock feeding from an amino acid standpoint.

High-amylose corn is another grain development. Amylose is the starch contained in corn and would be valuable industrially. Feeding value might be improved, too.

Most of the corn-breeding is done by adding new traits to existing hybrid lines.

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For instance, even the dwarf varieties that are close to release are shortened versions of standard hybrids. Corn breeders explain that the performance of our existing corn hybrids is pretty acceptable to farmers.

The poultry population of the U.S. annually produces about 2.2 million tons of a 10-8-4 fertilizer. Addition of superphosphate to conserve the nitrogen will produce the same tonnage of a 10-20-4 fertilizer and 5.5 million tons of humus.

Any changes, they reason, that would drop some of the features of our present corns would discourage growers from adopting the new varieties.

Another reason they favor using existing hybrid lines is that the yield and performance ceiling has not been reached with them. They figure that many of the new features such as high amylose, high oil, and other new developments can be bred into existing hybrids.

Now let's look at some of these new hybrid-corn developments. Dwarf corn, as mentioned earlier, is probably the closest to release. Dr. Earl Leng, University of Illinois plant breeder, has been doing much of the dwarf-corn work in the Midwest.

He says that dwarf-corn varieties solve one big problem in corn production — standability. Conventional hybrids have pretty well eliminated the root-lodging problem, but stalk breakage which leads to lodging still has not been bred out of conventional hybrids.

Dwarf varieties give you nearly complete standability at harvest time, something conventional hybrids do not accomplish.

Leng also points out, though, that dwarf hybrids may not give all the answers. So far they will not yield up with conventional hybrids, and you cannot use high plant populations without cutting the yield rather sharply.

Also, Leng notes that early harvesting helps cut the losses in conventional hybrids. Most of the corn losses from stalk breakage occur in the period between frost and harvesting. Early harvesting would eliminate the major portion of the losses. If heated-air drying is widely adopted, widescale early harvest would be practical.

With these drawbacks, Leng regards dwarf hybrids as just an interim step in the progress of corn varieties. He thinks that the dwarfs will find their greatest advantage in the mid-South area which would include southern Illinois and Indiana.

Here, the full-season corn varieties are tall and the standability problem is exceptionally bad.

The dwarfs have certain other advantages that may make them attractive to commercial corn growers. Because of their short stature, some agronomists think that dwarfs will make a good nurse crop to go from corn to a legume crop. Also, harvesting the dwarf varieties is considerably easier and faster.

Leng has been working with what plant breeders call a brachytic plant type. Purdue plant breeders have been experimenting with another generally referred to as a reduced-plant type.

Although the Purdue work is not too far along, one of the big advantages of the reduced-plant type is that it will stand extremely heavy populations. Quite possibly, future dwarf varieties may be planted at population rates now considered impossible.

Purdue plant breeders are attempting to breed resistance to blights, wilts and rots into corn-belt-adapted hybrids.

Northern and southern leaf blight are the two big blight problems facing farmers. Both can cause considerable economic loss in years favorable to the disease.

Purdue tests indicate that the blights can cut yields enormously. Some Purdue work indicates that blight-resistant lines can yield as much as 70 bushels more to the acre than non-resistant lines under high-blight infections.

Under field conditions, losses probably won't be nearly as much as the tests, but they can be pretty important in years of heavy infection. Purdue plant breeders have had pretty good success with developing a blight-resistant hybrid line.

Any dairyman is justified in putting the best land he owns into good productive pasture. Well managed pastures are the cheapest source of total digestible nutrients, an important step in offsetting declining milk prices.

They hope to have a line out by 1960 that will be resistant to both northern and southern leaf blight and to Stewart's wilt. They have isolated the highly-resistant lines.

Stalk rots are a different problem. Rot seems to be linked to inheritance factors, soil fertility, and adapted hybrids. The Purdue plant breeders are working on isolating highly resistant stalk-rot lines and hope to have something to the corn grower in a few years.

They point out that farmers can help the stalk-rot problem by watching their fertility program. Where you make high nitrogen applications in the presence of potash shortages, stalk

rot is a real threat. Don't make heavy nitrogen applications without making sure that your soil's potash level is medium or above.

Early-maturing hybrids grown under full-season conditions seem to be more susceptible to stalk rots. You can help the rot problem by planting full-season varieties.

Things are really going to the dogs nowadays. Anyway, that's the way it looks according to a recent report which discloses the fact that animal-loving Americans spent $175,000,000 feeding their pets in 1956. This is exactly the same amount that went into grocery cash drawers for baby food.

Cornborer resistance is another goal of corn breeders. University of Illinois workers have experimental lines which they think are at least twice as resistant to cornborer attack as some of our current resistant types.

Dr. R. W. Jugenheimer, University of Illinois plant breeder, points out that one of the new experimental lines, cornborer-resistant Illinois 3049, out-yielded the standard variety, U. S. 13, by 14 bushels per acre, and 96 per cent of the plants were erect at harvest time.

Only 76 per cent of the U. S. 13 plants were standing erect at harvest. Other lines carry similar resistance to cornborer attack.

High-amylose corn is also another potential industrial raw material. Amylose is found in corn starch. Present varieties contain about 30 per cent amylose, but experimental varieties have been produced with as much as 80 per cent amylose.

Commercial corns are available that have amylose percentages in the 55 to 60 range. Corn breeders hope that corn processors will start working more intensively on industrial applications for high-amylose corn with the presently available materials.

Amylose has been used to produce experimental films and fiber. It is hoped that it can be used in plastics construction. A lot of research remains to be done with amylose, but it still looks to be one of the brightest prospects in industrial raw materials.

Jugenheimer has also been working with high-oil hybrids. Some of the high-oil hybrid lines have been able to produce as much as 14 per cent more protein and 33 per cent more oil than regular hybrids. In addition, these high-oil lines have been giving up to 8 per cent more yield over standard hybrid check varieties.

High-oil and protein hybrids are important to the feeder. The protein content in these hybrids is higher and nutritionists think

that the protein itself is more balanced with essential amino acids. With the right corn proteins, the protein supplement bill could be cut down a lot.

Industrial potential for high-oil hybrids is also good. Corn oil has many uses now and researchers think that potentially it has even more.

Jugenheimer also explains that he doesn't think industrial users will pay a large premium for these special types of corn. That means they will have to be as good or better than our present hybrids, and improved for the livestock man.

Tetraploid corn is another interesting development in corn breeding. Dr. D. E. Alexander, University of Illinois, has been doing some rather extensive experimentation with tetraploid corns.

He explains that tetraploid corns are quite similar to standard corn varieties. The biggest difference is in the chromosome make-up.

Milk cow (carcass) value rose to $176 in 1957, the U. S. Department of Agriculture says, a jump of about $30 per animal.

Differences that you can see are thicker leaves, heavier stalks, and larger kernels. Alexander also things that the tetraploid corn will have higher protein and oil levels along with increased starched content. He has not completed analysis tests as yet.

The popcorn-dent-corn cross resulted in a much smaller cob. This should make the drying period faster. Milling qualities of this cross could be important to the export market.

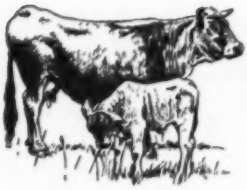
When You Plant Makes a Difference

Here are results of five years of checking what happens to corn planted on different dates in Illinois:

Ave. date of planting	Yield	Moisture %	Plants erect at harvest %
May 4	112	18.3	80.4
May 12	108	19.5	79.5
May 19	111	20.7	78.4
May 27	110	21.5	69.6
June 3	101	23.5	66.6
June 12	89	25.5	54.0

Yields are high for all of May, but earlier May dates show lower moisture and more stalks standing. From Agronomy Release No. 79, University of Illinois. —*Dowell News Letter*

How to Avoid Abortions from Marshland Weeds



Mysterious abortions on unimproved marshland pastures are caused by cattle eating weeds high in nitrates . . .

Condensed from The Kraftsman

EVER wonder why a cow or heifer would lose her calf out on summer pasture when there is no indication of brucellosis in the herd. If a germ didn't cause the abortion, what did?

It could have been something the cow ate, or to be more specific, something in one of the plants she ate.

Unexplained abortions in cattle have been evident for 50 years. Many were not investigated or reported because people thought Bangs disease was the cause. In 1954, 400 such abortions were reported in one Wisconsin county alone. Such alarming statistics called for action.

J. M. Sund and M. J. Wright, assistant professors of agronomy at the University of Wisconsin, teamed with veterinarian Joe Simon. Investigations showed that many of the mysterious abortions on unimproved marshland pastures were caused by cattle eating weeds which were high in nitrates.

Red-berried elder, certain species of goldenrod, stinging nettle, white and purple boneset seem to be the weeds most responsible. Bull thistle, Canada thistle, burdock, lambsquarter, pigweed, and young plants of cinquefoil are also included in the nitrate storing group of weeds, but these were not always present in the pastures studied.

Sedges, milkweed, spirea, willow, linaria and many other weeds were not responsible for abortions.

In 1957 Sund's group had ten cows on sprayed and treated marshland and all had calves at the end of the season. They had 17 pregnant heifers on untreated areas or treated areas that were still weedy. All of the heifers lost their calves.

The scientists know that weeds caused abortions and they know

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that one common substance, nitrates, in the weeds caused the abortions.

A simple remedy will prevent these abortions and at the same time is beneficial to dairymen. Weedy areas should be sprayed with 2,4-D. If there is much brush, some 2,4,5-T will help get a good kill. It is advisable to avoid pasturing until the grass has made a good growth and the weeds have died down because plants killed by 2,4-D may contain large amounts of nitrate.

Cows don't like to eat the trouble-making weeds unless they are forced to. A good application of fertilizer to a weed-free pasture will increase its grazing capacity and insure good production. Just getting rid of the weeds is a good step toward higher production, and it removes any threat of nitrate abortions due to weeds.

Sund's group is now studying effects of various fertilizer elements on uptake and storage and the utilization of nitrates in plants to see what can be done with fertilizer to overcome storage of nitrates. They are also analyzing weeds gathered during the summer to find the most offensive periods. Sund believes further investigation of the nitrate problem may lead to explanations for occasional abortions and deaths on grass silage, corn silage, oat silage, and the occurrence of silo gas.

Why Is the World Getting Warmer?

Why the world is warming up is a mystery. Since about 1900 the climate of the earth has been slowly growing warmer. The increase in warmth has amounted to about 2.2 degrees fahrenheit in the last 50 years.

The warmer climate may be caused by a slight change in the amount of carbon dioxide in the earth's atmosphere. By burning up about 100,000 million tons of coal and oil since 1900, man himself may be changing the climate. Carbon dioxide from these fuels and water vapor above the earth's surface act like a greenhouse, trapping heat.

To date, scientists have known that the climate was getting warmer by observing the melting and retreat of the great Arctic ice pack in the far north.

Estimates of the Anarctic ice range from six million to 12 million cubic miles. If only 1% of this ice shelf should melt, the sea level around the world would rise from 8 to 30 inches.

—From World Science Review

Make Money With Your Corn Planter

It's a versatile machine that can plant corn, put on fertilizer, apply insecticides and spray for weeds . . .

Condensed from
Production Credit Association FARMING

THE way you run the corn planter contributes more to your harvest profits than anything else, except weather. You can't expect big yields without the kind of accurate planting that means a high population of corn plants. Starter fertilizer placed where it can give seedlings fast growth means bigger yields too.

Applying insecticides to check rootworm and other soil insects can mean an extra 7 to 10 bu. next fall. Band applications of pre-emergence weed control sprays bring extra bushels and lower cultivation costs too. Here's a closeup of some of the things that can be done at planting time:

1. Check Your Planter

Put your planter on blocks and check the drop before you pull into the field. Follow instructions that came with your planter to make sure it will drop the number of kernels required to produce the stand you want.

2. Plant on Time

Planting delays can be costly. In Michigan State tests, planting around May 1 has yielded 10% more than corn planted at the "normal" May 20 date. Each week's delay in planting cuts harvest 2½%. In Illinois trials, corn planted after May 27 showed much lower yields.

3. Plant Plenty of Seed

You need thick stands for big yields. It takes around 17,500 stalks to make 100 bu. of corn, 15,000 for 80 bu., 12,500 for 60 bu. and 10,000 for 50 bu. To get that kind of stand, you must plant 15% more kernels than the desired number of stalks.

If you average 40 to 50 bu., plant 10,000 kernels per acre, unless you plan to increase fertilizer. Hill-checking 3 kernels in 40-inch rows equals 10,000 per acre.

Planting 14,000 kernels offers a better chance for yield increases if your usual yields run around 60 bu. Larger populations require power-checking or drilling

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since even the 4 stalks per hill needed for 16,000 plants is too many for best results.

Drill 3 kernels every 22 inches for 100-bu. corn; 2 every 18 inches for 80 bu. populations.

4. Take it Easy on the Field

You pay heavy fines for speeding in the cornfield. "Three miles per hour ought to be the speed limit for most corn planters," declares Robert White of Michigan State. He figures the fine for speeding is about 800 plants per acre for each mile per hour above 3 m.p.h. Speed causes inaccurate kernel spacing and a little change makes a big difference. Spacing seed 9½ inches instead of 9 inches adds up to a 500-kernel per acre difference.

5. Plant Around the field

If you plant in a rectangular field, plant around the perimeter and avoid end-of-row stops. "Main purpose of rows is to rest the horses at the ends," is the way one ag engineer puts it. Planting, cultivating and picking go faster when you can keep moving.

6. Apply Insecticide to Seed

Mix aldrin or heptachlor with starter fertilizer at the rate of 1 lb. per acre. Iowa tests show these insecticides stop grubs and root worms that often steal 7 to 10 bu. per acre, particularly in second-year corn.

7. Apply Weed Control Spray

A simple applicator behind the planter will spray a band of weed control chemical. Randox is a new chemical that kills grassy weeds; 2, 4-D is cheapest pre-emergence control for broadleaf weeds.

8. Put on Starter Fertilizer

Use an attachment on your planter that puts fertilizer 2 inches to the side and 2 inches below seed. That's the way to avoid injury and to get the most "kick' 'out of your fertilizer. John McGregor, Univ. of Minnesota, found that this placement for 200 lbs. of 5-20-20 added 10.7 bu. to yield.

Starter fertilizer feeds the corn plants all the way from germination to knee-high stage. "This probably is the most important period in the corn plant's life cycle," observes A. J. Ohlrogge of Purdue. If you are short on fertilizer dollars, spend them on starter. It's a practice that can add 10 to 15 bu. per acre or perhaps even more.

Some farmers are turning to liquids for easy, even-flow plant food application. Liquid fertilizer equalled solids in comparable field placement in Michigan tests. Corn treated with liquid plant food got an earlier start.

Corn planting is a job that takes planning, careful operation and plenty of attention to detail. Match stand to your soil and fertility, control the pests and you will be off toward a high-yield, high-profit corn harvest next fall.

Can You Afford to Irrigate Corn?

Results of a comprehensive study of costs and results of irrigating corn on different types of soils . . .

Condensed from
Michigan's Quarterly Bulletin

C. R. Hoglund,
Michigan State University

UNDER what conditions does it become profitable for a farmer to irrigate corn? How much of an increase in yields can he expect when he applies irrigation water, and more fertilizer, seed, and labor on soils with different water-holding capacities? How important is the relative price of corn in determining the profitability of irrigation? These are but a few of the questions farmers need answered to decide whether to invest in an irrigation system.

During 1956 and 1957, a study was made of the irrigation operations on a small number of cash-feed-crop farms in southern Michigan. Detailed information was obtained on water sources, investments in irrigation equipment, yields, and receipts and expenses associated with the irrigation of corn. Seven Indiana farmers who have irrigated corn for several years were visited during 1957.

Variability of Yields and Rainfall

During very favorable climatic conditions when rainfall is ample and well distributed, non-irrigated corn may yield nearly as much as irrigated corn. Corn hybrid tests conducted during 1956 on a farm in St. Joseph County, Michigan, showed only 8 bushels greater yield on the irrigated corn. Climatic conditions were very favorable during 1956 for corn production. The soil on this farm was Warsaw sandy loam, a soil with low water-holding capacity. Irrigation increased corn yields by more than 40 bushels during the less favorable years.

Both the frequency and length periods in which no rainfall occurs affect corn yields. Humidity, temperature, and wind are additional factors influencing yields. Forty-five years of weather data from East Lansing, Michigan show that periods of 1 week (5 to

Reprinted from the Quarterly Bulletin, published by the Michigan Agricultural Experiment Station, Michigan State College, East Lansing, Michigan

9 days) with less than .2 inch rainfall per day occur several times each year during the 4-month period, June 1 to September 30. These weekly periods without rain occurred most frequently during July, August, and September.

Periods of 2 weeks without rain were noted 42 out of the 45 years. During 17 of these years, 2-week dry periods occurred 4 or more times during the growing season. Two to 3 weeks without rain were reported for 19 or slightly more than 1 in 3 years. Dry periods of 30 or more days occurred once every 9 years. When extended periods of no rainfall occur, particularly during the tasseling and silking stage, corn yields are greatly reduced.

Agronomists estimated that from 20 to 24 inches of water are needed during the growing season to produce 80 to 100 bushels of corn per acre. This is the quantity of water used by plants or lost by evaporation. Rainfall during the growing season often totals only 10 to 15 inches.

The need for supplementary irrigation depends on the distribution of the rainfall as well as the total quantity. For high corn yields, soils must store moisture and release it as it is needed. Soils vary greatly in their water-holding capacities, depending on structure, texture, and quantity of organic matter present. The inches of available water stored in the rooting depth of corn grown on a select group of Illinois soils ranged from a low of 5 inches on the sandier soils to 14 inches on Muscatine silt loam, a productive, loess-formed soil. Depth of rooting is influenced by the physical characteristics of the soil profile as well as by fertilizer application and soil treatment.

Profitable Irrigation Practices

The extent to which it may pay to irrigate corn depends on several important factors. Timeliness in applying irrigation water is important. A common mistake often made by beginning irrigators is to attempt to cover more acres than their system is engineered for or to operate with too little labor. During extended periods without rain, particularly during the tasseling and silking stages, it may be necessary to make complete irrigation cycles every 7 to 10 days.

Irrigation of corn is more difficult and time consuming than irrigation of most other crops. Moving lateral lines to new locations can be speeded up considerably and drudgery reduced when driving strips are established where the lateral lines are to be placed. Some farmers have left 7- to 10-foot sod strips 180

feet apart. Four to 5 per cent of the field is thus used for driving a tractor, truck, or jeep when pipe is moved.

Silly Suggestion: Boost fertilizer sales by shaping bags like a handsome young lady—measurements 35-26-36. Bags would be pleasant to look at and much nicer to handle.

A crew of three men was used in moving pipe on the larger irrigation operations observed. One man drove the power unit and the other two loaded or unloaded pipe. A crew of this size could not be profitably employed except on farms where large acreages of corn and other crops are produced. One of the men moved sprinklers when he was not assisting in moving pipe. From 2 to 3 inches of water were usually applied at each setting in irrigating corn. Lateral lines were moved to a new location two or three times a day, depending on the number and capacity of the sprinklers used and the quantity of water applied.

Corn Yield Responses to Irrigation

Corn yields are influenced not only by the quantity of water available, but also by the stalk population and quantity of fertilizer applied. Agronomists suggest that an optimum stalk population for the sandier soils such as Fox sandy loam are about 12,000 to 14,000 without irrigation and 18,000 with irrigation. Comparable figures for moderately productive soils such as Miami silt loam are 16,000 without irrigation and 18,000 with irrigation. The available water-holding capacity of Fox sandy loam is low and of Miami silt loam is moderate.

It is estimated that under price relationship existing during 1957 it would pay to apply 200 pounds more fertilizer on the irrigated corn at pre-planting time for the Fox soils and 150 pounds for the Miami soils. Increases of 60 pounds of nitrogen applied on the Fox sandy loam and 40 pounds applied on the Miami silt loam soils were used in calculating the additional expense of sidedressing the irrigated corn.

Experimental data and farmer experiences indicate that under average weather conditions corn yields on Fox sandy loam soils can be increased by 40 to 60 bushels per acre by irrigation, a higher stalk population, and the use of more fertilizer. A 2-year study in Indiana on Plainsfield sand, a very droughty soil, resulted in an increase of 77 bushels of corn per acre in favor of irrigation. During 1956, when climatic conditions were better than normal during the growing season, the irrigated corn produced 51 bushels more than the non-irrigated corn.

It is estimated that corn yields can be increased by 25 to 30 bushels per acre when irrigation water is applied to corn grown on Miami silt loam. Average acreage increases of 50 bushels for the Fox sand loam and 28 bushels for the Miami silt were used in calculating the additional returns resulting from irrigation.

Irrigating Large Acres of Corn

The economic consequences of investing in an irrigation system and the irrigation of 150 acres of corn has been tested out for farms with Fox sandy loam and Miami silt loam soils. A farm with this acreage of corn was selected for study because labor and equipment would be used very effectively.

It probably would not be economical to irrigate as few as 40 or 50 acres of corn if no other crops were irrigated. Investments and annual expenses in owning and operating an irrigation system were calculated with water supply from a reservoir and from a deep well.

Two large reservoirs which are fed by springs, streams, or underground water would be needed for the irrigation of 150 acres of corn. The water supply must be adequate for an extended drought period. It requires 30,000 gallons to put 1 inch of water on 1 acre, allowing for losses in evaporation and maldistribution from applicators.

It has been suggested that to apply 8 inches of water per acre for the season, 280,000 gallons would be needed when allowance is made for losses in getting water to the crop. The cost of a deep well, 10 inches in diameter and 200 feet in depth, was calculated at $2,400. The investment in a water supply would vary greatly between farms.

The investment in a complete irrigation system totaled $10,300 when water was obtained from reservoirs and $13,300 for the system with a deep well.

The investment for a complete system using a river or lake as a source of water supply would be about the same as for the system using reservoirs. Extra cost of 40 rods of main line pipes is estimated to equal the cost of constructing two reservoirs. Many farmers do not have access to a surface source of water and thus must invest in the more expensive deep well.

Changes in Receipts, Expenses

The value of additional corn produced with irrigation has been valued at three prices in the table following; namely $1.00, $1.20, and $1.40 per bushel. Each 10 cent change in the price of corn would add to or subtract $750 from gross receipts for the farm with Fox sandy loam soil. A similar price change would increase or decrease gross receipts by $420 on the farm with Miami

silt loam soil.

Only those expenses that changed as a result of owning and operating the irrigation system were calculated. Depreciation, repairs, and interest on the additional investment added $1,132 for the system with reservoirs and $1,420 for the system using a deep well. Fuel and lubricants used in applying 8 inches of water on the corn produced on the Fox sandy loam soil added from $1,050 to $1,200 to expenses. These extra expenses were only half as high when 4 inches of water were applied per acre on the corn produced on the Miami silt loam soil.

Fertilizer and seed added more to expenses than any other item. Cost of harvesting and hauling the extra corn produced was calculated at 8 cents per bushel. Extra labor used in moving irrigation pipe was charged at $12 per day. It was estimated that the equivalent of 80 days of hired labor would be needed in irrigating the 150 acres of corn grown on the Fox sandy loam soil. This would be reduced to 60 days on the farm with Miami silt loam soil. The extra expenses in owning and operating the irrigation system, and supplying the extra seed, fertilizer, and labor added $30 to $43 per acre to the total expense.

With corn valued at $1.00 per bushel, net income would be increased by $1,508 when water was obtained from reservoirs and applied to 150 acres of Fox sandy loam soil. When it was necessary to invest in a deep well, net income was increased by $1,070. The investments in an irrigation system on the farm with Fox sandy loam soil, with corn priced at $1.00 per bushel, earned 18 per cent and 11 per cent, respectively for the systems using reservoirs and a deep well as sources of water.

Soybeans from a third of the acreage planted to this crop in the U. S. last year were sold in foreign countries.

Fifteen hundred more dollars were added to net income at the $1.20 price for corn. Investment in irrigation equipment on the farm with the sandier soil would be extremely profitable if corn sold at $1.40 per bushel. On the basis of the calculated changes in production and expenses, an investment in irrigation equipment would not be profitable if the price of corn dropped much below $1.00 per bushel.

Investment in an irrigation system to be used in irrigating large acreages of moderately productive soil such as Miami silt loam does not appear profitable unless the price of corn is at least $1.40 per

bushel. Further research is needed to determine the responsiveness of crops to irrigation when grown on soils having medium to high water-holding capacities.

Limited research data indicate that during 1956, a year of much below average normal rainfall in western Iowa, corn yields were increased by as much as 70 bushels per acre on medium-textured soils with a high water-holding capacity. The profitability of irrigating corn grown on soils of moderate to high water-holding capacities depends on the frequency of dry periods such as that which occurred during 1956 in portions of the western corn belt.

Estimated changes in production, and annual receipts and expenses when 150 acres of corn are irrigated in southern Michigan's Fox sandy loam and Miami silt loam soils (1957).

Item	Fox sandy loam		Miami silt loam	
	Source of irrigation water			
	Reservoir	Well	Reservoir	Well
Additional production				
Bushels of corn	7,500	7,500	4,200	4,200
	Dollars	Dollars	Dollars	Dollars
Additional receipts				
Corn at $1.00 bu.	7,500	7,500	4,200	4,200
Corn at $1.20 bu.	9,000	9,000	5,040	5,040
Corn at $1.40 bu.	10,500	10,500	5,880	5,880
Additional expenses				
Irrigation				
Depreciation & repairs	817	1,021	817	1,021
Int. on investment	315	399	315	399
Fuel & lubricants	1,050	1,200	525	600
Fertilizer and seed	2,250	2,250	1,700	1,700
Harvesting and hauling .	600	600	360	360
Hired Labor	960	960	720	720
TOTAL	5,992	6,430	4,437	4,800
Net increase in income				
Corn at $1.00 bu.	1,508	1,070	-237	-600
Corn at $1.20 bu.	3,008	2,570	603	240
Corn at $1.40 bu.	4,508	4,070	1,443	1,080

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